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# Light and Lighting

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## Higher Values Necessitate New Methods

VERY Interesting—the account of American Methods by Mr. Lingard at the Opening Meeting of the I.E.S. Commercial Lighting Section (see p.260).

In shops and stores 30 to 50 foot-candles have become quite usual, and in offices values considerably higher than are commonly found in this country.

Of course, commercial lighting is *the* field where it is easiest to make advances—once the customer is convinced that Brighter Lighting Pays. At the other end of the scale is Street Lighting where the need for improvement is doubtless much greater—but the readiness to pay, much less!

### Higher Values, however, mean New Methods.

Luminous panels and diffusing glass globes capable of furnishing 50 foot-candles become inconveniently bright. Hence, the general tendency to avoid glare by reverting to Indirect Lighting.

Another problem—the fact that increased light is usually accompanied by increased heat—is rendered less difficult in America by the general use of systems of air conditioning in large commercial buildings.

If the advances in foot-candles predicted by Mr. Lingard become usual in this country they may also bring with them changes in the technique of ventilation.





### Many Meetings

Meetings dealing with various phases of illumination are now in full spate. To those interested only in some particular aspects—say decorative lighting—the problem is simple. But to those with many interests the I.E.S. is certainly offering an *embarras de richesse*. Perhaps the greatest tax is imposed on those called upon to preside. At the first meeting of the public lighting section on October 16th, it was explained that Mr. F. C. Smith was taking the chair owing to the absence of Mr. E. Stroud, who had been called away at short notice to preside over the opening meeting of the Midland local centre at Birmingham, in place of Dr. English (also called away unexpectedly), who was deputising for the President (Mr. Percy Good), now absent in Australia!

### Siting Lamp-posts

The discussion on the "siting" of sources in street lighting installations was of a very practical nature. Siting may have quite as much to do with the success of a scheme as the illumination provided. A useful object lesson was provided by Mr. J. G. Christopher, Mr. F. K. Garry, Mr. K. F. Sawyer, and Mr. L. M. Tye, who had independently visited two thoroughfares in the London area, and had determined where lamps should be situated. The lengths of roadway considered were specially selected in view of the awkward problems encountered (turns, bends, roundabouts, etc.). This is just the kind of detailed study which the Section should provide—such as is scarcely attainable at large general meetings or at conferences where audiences run into hundreds and time is usually limited.

### The Trend of Decorative Lighting

A meeting of quite a different character was that on October 25, when a paper by Mr. A. B. Read on "The Trend of Decorative Lighting, and is it Desirable?" was presented. The paper was embellished by lantern slides showing the trend of progress, and bristled with controversial points, such as the query whether one should "start off with a confused idea of what one thinks the public wants," or endeavour to express one's own sincere impressions and rely on public good sense to recognise their value. Most of the audience evidently sympathised

with Mr. Read's remark that the subject is a matter of feeling rather than words, but, nevertheless, made desperate efforts to give verbal expression to the faith that was in them. Those present generally endorsed the advance towards compact, simple, domestic fittings in place of certain inefficient and sometimes pretentious creations of the past. But there were some who complained of the chilly effect of modern creations in shining glass and metal, contending that established systems of lighting had carried a certain genial message of home, warmth, hearth, security, friendship, etc., besides being, at their best, by no means badly adapted to the end in view. At the moment, indeed, it seems difficult to say precisely what is the message to be associated with modern lighting, though perhaps it is as yet too early to try to find verbal expression for this. Mr. R. O. Sutherland, who presided, made an excellent chairman, and was apt in eliciting comments on a somewhat difficult subject.

### Artificial Lighting for Football Grounds

This is a subject on which we have occasionally touched in the past. We are reminded of it by some recent comments in the Press in regard to a match on the Arsenal ground, where a certain amount of floodlighting is available. On that occasion, as is not unusual in the winter, visibility was poor. Before the end of the game spectators could no longer follow the movements of the ball, and only with difficulty those of distant players. People, in fact, had begun to leave the ground some time before the end of the match—when the floodlights were turned on to enable the ground staff to attend to the pitch. The question may naturally be asked "why only after the match?" The explanation appears to be that the Football Association will not permit artificial lighting whilst a game is in progress. If so this does seem unfortunate. To play games at night exclusively by artificial light does certainly involve difficulties (though it is not infrequently done in connection with professional rugby matches). But there are many occasions when a little artificial light used as a supplement to daylight, would make all the difference between visibility and obscurity. Meantime, some of us are looking forward to the University match at Twickenham in December, which is notoriously apt to end in partial darkness.

## I.E.S. Midland Local Centre Opening Meeting

The newly formed local centre for the Midland area, with headquarters in Birmingham, promises to be a very successful and active one. Credit should be given to their Chairman (Mr. Howard Long), their Honorary Secretary (Mr. A. E. B. Wallis), and their committee for their energetic efforts to set the ball rolling. Since it was agreed, earlier in the year, to form this centre there has been an encouraging influx of members, and a number were enrolled at the conclusion of the opening meeting on October 21. At this opening meeting there was a representative display of lighting equipment, eleven firms participating, which was remarkable in being assembled almost entirely by local effort.

Mr. E. Stroud, who undertook at somewhat short notice to attend from London and deliver the opening address, reviewed recent outstanding developments such as the M.O.T. Report on Street Lighting, the B.I.S. street lighting specification, and the forthcoming Home Office Report on Factory Lighting, and pointed out the opportunities for local centres to pursue the study of subjects of special local interest. He recalled the great growth in the Society's activities as illustrated by the creation of five local centres and also five special sections in London. The Council in London took the keenest interest in the progress of local centres, and were anxious to help their development in every possible way. He understood that in Birmingham a very substantial membership had already been obtained, second only to that in Leeds (where over 100 members had been secured, and where official recognition was now being sought). After touching on various points in connection with the organisation of local centres with which the Council had recently been occupied, Mr. Stroud, in conclusion, referred to the important question of establishing a higher grade of membership, on which point it was hoped soon to have some concrete proposals to lay before members as a whole.

## Discussion on the Forthcoming Report on Factory Lighting

It may be recalled that a very successful discussion on the lighting provisions in the new Factory Act (1937) was arranged by the I.E.S. Industrial Lighting Section in March last. At that time the matter could be discussed merely on very broad lines, as the Act only specified adequate and suitable lighting in general terms. An opportunity for a more detailed discussion will be afforded as soon as the Report of the Departmental (Home Office) Committee on this subject (which is expected to be issued almost immediately) is made public. We gather that it is intended to follow the method which proved so useful before, of arranging an initial interchange of ideas by speakers expressing different viewpoints.

It has now been decided that the discussion shall take place on Tuesday, January 17, which will be made available by the decision of the Council to postpone for the present the discussion on "Lighting in Relation to Air Raid Precautions," originally fixed for that date.

## SITUATIONS VACANT

**An Illuminating Engineer is required**, with good experience of planning lighting installations, for a well-established firm of electrical engineers. Please write, stating age, experience, and salary required, to Box "A," "Light and Lighting," 32, Victoria-street, London, S.W.1.

**A young man is required**, about twenty years of age, for training in illuminating engineering. Work will entail planning of lighting arrangements, and will offer a good opening with a large firm.—Apply, stating salary required, and age, to Box "B," "Light and Lighting," 32, Victoria-street, London, S.W.1.

## "Built-in" Lighting for a Library



The above picture shows a view of the Edmonton (North London) Library, which comprises one large hall divided into sections. In the reading room single-panel dished Control units give effective illumination for the newspaper racks against the walls. In the library three-panel fittings fixed to the ceiling round the daylight illuminate the book shelves on either side without any local lighting being necessary. The scheme was designed by Holophane, Ltd., in conjunction with the architects and borough engineer's department, and the North Metropolitan Electric Supply Company.

## I.E.S. Meetings

N.B. Unless otherwise announced all meetings commence at 7 p.m.

### LONDON.

- Nov. 8th. Visibility of Street Lighting** (C. DUNBAR, F. C. SMITH AND J. M. WALDRAM); *Institution of Mech. Engrs., Storey's Gate, Westminster, S.W.1.*
- Nov. 14th. Elec. Discharge Lamps in Industry** (C. A. HUGHES); *Home Office Industrial Museum, Horseferry Road, S.W.1.*
- Nov. 16th. Combined Tungsten and Elec. Discharge Lighting** (W. R. STEVENS); *E.L.M.A. Lighting Service Bureau, 2 Savoy Hill, W.C.2.*
- Nov. 22nd. Problems Evening** (A. MANSELL, A. W. BEUTTELL, and G. LOVELL); *Gas Industry House, 1, Grosvenor Place, Westminster, S.W.1.*
- Nov. 29th. Outdoor Photometry**; *Junior Institution of Engineers, 39, Victoria Street, S.W.1.*
- Dec. 7th. Lighting of the Glasgow Exhibition** (R. O. ACKERLEY and A. MANSELL); *Gas Industry House, 1, Grosvenor Place, Westminster, S.W.1.*
- Dec. 9th. Visit to Street Lighting Installations** (Hackney, Hornsey and Paddington).
- Dec. 13th. The Response of the Eye to Light in Relation to the Measurement of Subjective Brightness and Contrast** (DR. W. D. WRIGHT); *Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1.*
- Dec. 19th. Light in Relation to Production** (T. E. CATTEN); *E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C.2.*

### MANCHESTER.

- Nov. 16th. Visibility of Street Lighting**; *Engineers' Club, Albert Square. (7.15 p.m.)*
- Dec. 14th. Lighting in the Cotton Industry**; *Electricity Showrooms, Rochdale.*

### LEEDS.

- Nov. 18th. Annual Dinner Dance**, *Powolnys, Bond Street.*
- Dec. 12th. Revealing Power of Street Lighting Installations** (F. C. SMITH, C. DUNBAR and J. M. WALDRAM); *Electricity Showrooms, The Headrow.*

### BIRMINGHAM.

- Dec. 2nd. Glass Manufacture** (W. M. HAMPTON); *White Horse Hotel, Congreve Street.*

### GLASGOW.

- Nov. 15th. Exhibition of Lighting Equipment**; *Room 149, Royal Technical College. (7.30 p.m.)*
- Dec. 21st. Some Aspects of Gas Lighting**; *"The Gordons," 19, Gordon Street. (7.30 p.m.)*

### DUBLIN.

- Nov. 15th. Photometry** (H. B. RUFF); *Engineers' Hall, 35, Dawson Street. (6.30 p.m.)*
- Dec. 20th. Problems Night**; *Engineers' Hall, 35, Dawson Street. (6.30 p.m.)*

It will be noted that the reading of Dr. Hampton's paper on Glass Manufacture before the Midland Local Centre in Birmingham has been postponed from Nov. 25th to Dec. 2nd.



# Commercial Lighting in the United States

In what follows we give a summary of the address given by Mr. H. Lingard, following his recent trip to the United States of America, delivered at the Opening Meeting of the Commercial Lighting Section of the Illuminating Engineering Society on October 27.

At the first meeting held by the newly-formed Commercial Lighting Section of the Illuminating Engineering Society on October 27, which took place at the E.L.M.A. Lighting Service Bureau, there was quite a good attendance.

Mr. H. Lingard, who has only recently returned from a trip to the United States, gave an interesting address reviewing progress in commercial lighting in that country, and there was a keen discussion. Mr. W. J. Jones, chairman of the Section, presided.

In his opening remarks, Mr. Lingard recalled how, from time immemorial, it has been customary for returning travellers to tell wondrous tales of their experiences. Improved communications and increased facilities for travel had taken a lot of colour out of such accounts; however, there still remains an occasional tendency to "gild the lily." It should, therefore, be understood that his talk had no official endorsement. The true perspective, in such a talk as this, is naturally that of an American lighting expert. He could only give personal impressions.

There were one or two factors influencing commercial lighting in America which should be borne in mind. One of these is the influence of a definite business depression which prevailed during the period of the visit. Another is the dominant position accorded to lighting in the development programmes of American public utility companies—which furnishes one of the chief reasons why American commercial lighting practice is in advance of our own. Whilst this might be regrettable from the standpoint of national prestige, the very fact that we are behind implies that there is much additional business ahead, and most people in the audience derived their income from selling better lighting, not from taking pride in it!

A review of the whole field of lighting, Mr. Lingard continued, showed that the most noticeable feature in American lighting practice is the great progress in commercial and domestic lighting. Industrial lighting, whilst progressive, is certainly no more so than our own, whilst street lighting, although presenting many points of interest, has evidently been limited by the unsuitability of series circuits for discharge lamps.

## SHOP LIGHTING

Shop-lighting in the United States is good because it is ample. But in achieving this standard lighting specialists have been confronted with a number of problems associated with discomfort glare. Only in rare instances are we in this country faced by the problem of providing, say, 50 ft.c. of general lighting, but it is a foregone conclusion, Mr. Lingard suggested, that in the next ten years our own commercial lighting will reach or exceed this figure. It is, therefore,



A large departmental store, Pittsburgh. A striking installation in which three methods of lighting, direct-indirect, indirect and direct are utilised. Average illumination 35 foot-candles.

expedient to mould lighting technique so that these higher values may be achieved gradually without incurring unnecessary criticism.

## SHOW WINDOWS

The technique of American show-window lighting differs little from ours. The chief divergence is in regard to levels of illumination, as illustrated in the adjacent table.

DISTRICT.	BRITISH (E.L.M.A.) RECOMMENDATIONS (for windows of average size).	AMERICAN (NELA) RECOMMENDATIONS (for windows of average size.)
Main Streets of Small Towns ...	53 watts per foot run ...	120 watts per foot run
Main Streets of Large Towns ...	100 " " " ...	200 " " "
Central Areas of Large Towns ...	133 " " " ...	400 " " "

It may next be asked what means are adopted to avoid overheating. In fact little trouble has been found, partly because reflectors are rarely boxed in or concealed behind false ceilings, and partly because the large stores are usually air-conditioned, or at least provided with effective ventilation. There is some merit in the simple practice of mounting reflectors direct on the window ceiling, hidden from view by a pelmet and screened by louvres.

Shop-window spotlights are having a new lease of life in the U.S.A. They employ a very compact, hard glass projector lamp and a large Fresnel lens giving a high luminous efficiency. Actual lighting effects



Showroom of the largest furniture company in America. Average illumination 20 foot-candles.



differ little from our own. At the moment "atmosphere" lighting, associated with display treatment, is in favour. Models are usually arranged in front of a curved matt, white screen on which dramatic white or coloured shadows are thrown from spotlights or louvred floodlights.

#### SHOP FACADES

Shop façade lighting follows familiar lines, except that there is less massing of luminous tubing and more use of filament lamps. A recent development of note is the use of illuminated glass bricks. Efforts during recent years to encourage the modernisation of shop fronts and the incorporation therein of luminous effects are bearing fruit. Façades using massed areas of glass bricks, illuminated in white and coloured light are becoming usual. An effective means of illuminating them is by indirect illumination from corrugated specular reflectors which in turn are lighted by silvered glass shop-window reflectors. (Within the last few weeks an installation using this principle has been included in the new E.L.M.A. demonstration shop.) There is an evident preference for three dimensional silhouette lettering in front of



A typical American shop-lighting installation with combined indirect and louvred down lighting. Average illumination 55 foot-candles.

luminous diffusing glass, giving an impression of uniform treatment lacking in some of our own shopping centres

#### SHOP INTERIORS.

It is not until one has passed into the American shop interior that major differences in practice become apparent. Transition from a sunlit street into the larger stores does not involve several minutes of dark-adaptation before useful vision is re-established. The impression is rather that the sun has accompanied one indoors. The general use of high-level general lighting, between 15 ft.c. and 50 ft.c., is achieved either by indirect lighting or by supplementary direct lighting fittings masked by louvres or lenses. A second feature is the thoroughness of methods of lighting showcases and other display areas by local devices. Glazed luminous panels and similar appliances are less in evidence, the reason being that their use in order to achieve such high illumination levels would introduce excessive brightness and discomfort glare. Similarly enclosed diffusing fittings are less adopted. Most of the indirect lighting is provided by anodised aluminium pendant fittings with rod suspension and high luminous intensity efficiency, of which about six main types are available. Efficiencies up to 85 per cent. are claimed. Silvered bowl lamps, or, alternatively, ordinary lamps with reflecting cups, are used, and sometimes a small louvre below the lamp to provide narrow angle downward light for display areas. In some cases special means are adopted to give mild brightness to part of the exterior of the fitting, so as to avoid the "silhouette effect" of fittings against the bright ceiling, which is apt to be considered un-



Entrance doorway showing use of illuminated glass bricks and effective silhouette sign.

sightly. Indirect lighting from specially designed brackets, attached to side walls, is sometimes preferred in interiors with limited ceiling height. About five watts per sq. ft., yielding 15-20 ft.c. service illumination, with a 30 per cent. depreciation, are usually allowed for this form of lighting.

Narrow beam direct systems using louvres are often adopted for high lighting of display areas, and, owing to the high basic level of illumination, there is no consciousness of excessive brightness contrasts. A very complete investigation of louvre lighting by J. M. Ketch and G. E. LaWall recently appeared in the "Transactions of the American I.E.S." (June, 1938).

The following three conclusions stated in that paper are noteworthy:—

#### (1) Reflector Shape and Finish.

Polished parabolic reflectors can be classed as "narrow beam"; spherical polished reflectors as "narrow" to "medium"; and polished elliptical, deep-etched parabolic or spherical, and flat white reflectors of any shape, as "wide spread." Louvres added to these reflectors reduce the light output in various degrees, but do not change the classification as to beam spread given above.

#### (2) Lower Form.

Of the forms tested, the concentric circular louvre rated highest in efficiency, followed in order by the polished cup and ring combination, and the plaid.

#### (3) Lower Finish.

Polished surface louvres are sparkling, but also capable of showing disturbing images of the lamp filament brightness. Deep-etched, flat-white, and grey louvres are three



An interesting effect in the studio of the "Chicago Tribune" new radio station. Horizontal bands of light are produced by 25 watt lamps in aluminium reflecting channel mounted behind panels of blue-flashed daylight glass. Powder blue walls, silver leaf ceiling and side decorations, mouse grey carpeting and vivid red morocco seats complete the colour scheme.

where comparisons can be made between appearance or brightness and efficiency. Black louvres reduce the brightness to a very low value, but this does not seem to justify the lower efficiency except where that effect is desired.

A still more recent form of glare-free direct lighting is achieved by Fresnel lens-type glass plates, set flush in the ceiling, with parabolic or spherical polished reflectors above. One ingenious device adopted in some pavilions at the New York World Fair Exhibition is to treat the vertical surfaces of prisms with amber enamel, other parts being left clear. When viewed from a position outside the direct beam the plate appears amber in colour, whilst in the beam unimpeded white light is projected.

Some reference should be made to the excellent arrangements made to guide the shopper from one department to another by means of luminous indicator signs, with silhouette letters in front.

#### OFFICE LIGHTING.

Most of the offices visited (usually of electrical manufacturers or supply interests, and, therefore, representative of the best practice) were illuminated by indirect fittings giving between 20 ft.c. and 30 ft.c. In a few cases there were also flush ceiling lighting, with high-intensity beams trained down on the desk. But the general level of illumination being so high such supplementary lighting is not usual. Even the "Study Lamp," so widely adopted in the American home, does not find much application in offices. The totally enclosed opal fitting, so popular in this country, is considered obsolete in America, one reason being that, with 30 ft.c., even the largest spherical fittings would appear uncomfortably bright.

#### HOTELS.

Although about a dozen visits were paid to first-class hotels, comparatively little good lighting was seen in the public rooms, dining rooms being often furnished in some period style and lighted by crystal chandeliers equipped with clear gasfilled lamps, etc., and in bars the prevailing fashion seems to be a very dim sort of lighting. In bedrooms, however, the lighting was of a high standard, both as regards convenience and quality, the average number of fittings in a bedroom with bathroom attached being eight.

#### CONCLUSION.

Finally, Mr. Lingard remarked that in the lighting industry we are accustomed to accommodating ourselves to drastic changes in standards and technique. The good lighting of to-day becomes the bad lighting of to-morrow. In this respect illuminating engineering differs from many other branches of engineering, where practice, once established, stands firmly for many years, if not for all time.

The discussion was opened by Mr. W. A. Sherrington, who, as an architect concerned with the lighting of large stores, expressed much interest in Mr. Lingard's address. He drew attention to a number of factors influencing practice in this country, such as the importance of avoiding glare, the variation in standards of brightness necessary in town and country districts, and the desirability of avoiding designs of fittings which were unsightly in the daytime. He also expressed the view that mass production should not be carried too far, and that lighting installations were most attractive when there was some evidence of distinctive design. Other points raised in the discussion, in which about a dozen other speakers took part, were the desirability of varying illumination according to the class of goods exhibited, the effect of heating on built-in systems of lighting, and the distinction between the lighting of commercial premises where lighting served as a selling force, and in the lounges of hotels, where people might prefer conditions that aided relaxation. Mr. Johnson, a visitor from Philadelphia, referred to methods of indirect lighting with floor standards, and Mr. E. S. Evans to the need for co-operation between makers of lamps and fittings and supply undertakings.

## Lighting Faults

At the opening meeting of the Industrial Lighting section of the Illuminating Engineering Society on October 17, Mr. W. Robinson gave a useful summary of faults in industrial lighting and their origin.

Mr. Robinson stated that whilst he had met many examples of good factory lighting yet in most installations there were obvious faults to be seen.

The first fault consisted of false economy and might be said to be the result of excessive thrift. It was a fault that often occurred in spite of all the efforts of the factory engineer.

A second fault was inadequacy. In this connection he recalled a storeroom lighted by one portable source in a metal lamp holder at the end of a length of flex. In another case a favourable impression of an installation intrinsically good was spoiled by the fact that the inspecting committee had some difficulty in descending the staircase where the illumination was extremely poor. It was quite usual to find that where much attention was paid to the lighting of working areas too little attention was given to corridors or gangways leading to them.

Great importance should be attached to glare, possibly the greatest fault of all. It was due mainly to insufficient shading of lamps or their use in the wrong position, but it might also arise in the form of harsh contrast between the ceiling and the working plane. Mr. Robinson contended that open type fittings were not expedient when the level of illumination exceeded 15 ft.c. and that there should be a definite relation between the output of a source in lumens and its mounting height.

Reflected glare was more common than was generally realised. It was apt to be troublesome in connection with sewing machines, often lighted by a small local lamp situated quite close to the needle and producing an image on the polished shuttle cover. Local lighting was popular because of the impression that it enabled a saving in the total consumption to be made. It was, however, often associated with excessive contrast and glare. He mentioned a case in which this form of lighting was used exclusively. The illumination at the sewing machine was of the order of 100 ft.c., but the illumination in other parts of the shop negligible. Local lighting should be limited and if there was a danger of glare by reflection the requisite illumination should be provided by general lighting.

Another instance of glare was in a printing works where, owing to imperfect placing of units, there was much reflected light from metal plates. Such effects might be minimised by using sources of low brightness (not exceeding 10 candles per sq. in.).

Yet another fault discussed by Mr. Robinson was that arising from excessive shadow. He had mentioned earlier a case of a crane driver working intermittently in his own shadow and he also quoted the case of a man climbing a ladder who attempted to grasp a rung which existed only as a shadow, and fell to the ground with fatal results. In rooms where overhead belting was much used the only method was to have close-spaced low wattage units mounted below the shafting level. Sufficient light to reduce the harshness of contrast should, however, reach the ceiling.

Many faults due to equipment fast becoming obsolete would not recur. The substitution of pearl lamps for clear bulbs was a case in point. The use of unearthed fittings in damp situations had given rise to fatal accidents. Low voltage should be considered where danger of shock existed.

In conclusion, Mr. Robinson emphasised the importance of regular maintenance and recapitulated the faults commonly found in lighting installations as follows: (1) inadequacy, (2) glare, (3) harsh contrast, (4) shadows, (5) excessive use of local lighting, (6) poor maintenance, and (7) use of the wrong type of lamp.



# Lighting Progress

A Review of the Exhibits and Demonstrations at the Opening Meeting of the Illuminating Engineering Society, held at the E.L.M.A. Lighting Service Bureau (2, Savoy Hill, London, W.C.2), on Tuesday, October 11, 1938.

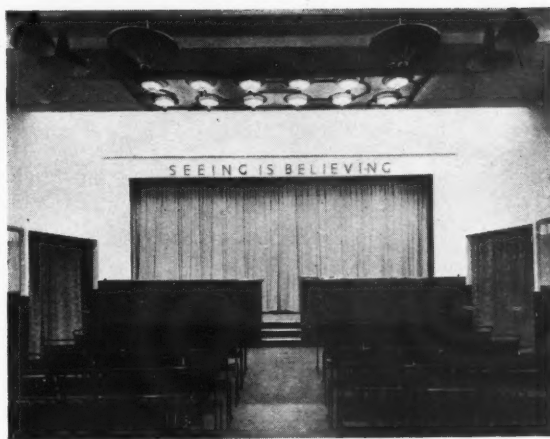
At the opening meeting of the Illuminating Engineering Society on October 11 there was, as usual, a comprehensive series of exhibits and an audience that taxed the resources of the enlarged theatre at the E.L.M.A. Lighting Service Bureau.

In opening the proceedings Dr. S. English explained that the new President (Mr. Percy Good) was unavoidably absent in New Zealand on a special mission, and quoted from a letter received from him explaining the circumstances and mentioning that he had already established contact with the Illuminating Engineering societies in Australia.

Before the display of exhibits commenced Dr. English made the customary awards, of the Leon Gaster Memorial Premium to Mr. J. W. Ryde for his paper on "Luminescent Materials and their Application to Light Sources," and of the Silver Jubilee Commemoration (1934) Award to Mr. H. J. A. Turner for a contribution dealing with "The Application of Electric Discharge Lamps to Photography."

## THE RECONSTRUCTED BUREAU.

The first item on the programme was an account, by Mr. H. Lingard, of the reconstruction of the Bureau in order to meet the increased demand on its services. The most outstanding feature has been the rearrangement of the lecture theatre, now capable of accommodating audiences of at least 300 people. The auditorium can be illuminated by any of five distinct industrial lighting systems and three commercial installations. One novel and interesting feature is an arrangement whereby electric discharge lamps can be brought up to normal condition of burning and then revealed to the audience by a device which instantaneously removes screens in front of them and exposes the fittings to view. Units can be switched off in a similar manner. After demonstrating this arrangement Mr. Lingard showed, by the aid of the projected reading of an illumination photometer, how an illumination from indirect units of the order of 70 foot-candles can be obtained throughout this large room. By switching on additional units a peak value of 160 foot-candles



A view of the new Lecture Theatre at the E.L.M.A. Lighting Service Bureau, with curtains closed. The indirect lighting of the platform from a recess overhead is a unique feature.

can be provided. As an amusing contrast, Mr. Lingard demonstrated the effect of the fittings (filament lamps in conical opal shades) originally in use when the Bureau took over the interior—furnishing a value of 0.5 foot-candle!

Around the walls of the theatre a new form of decorative louvred cornice, furnishing both direct and indirect lighting, has been installed. Perhaps the most interesting part of the new lighting, however, is the illumination of the platform, from sources mounted in a curved recess overhead, which is at once bright and highly diffused and should, it is suggested, serve as a model for lecture theatres throughout the country. Numerous forms of auxiliary lighting are also provided.

There is also much of interest in the areas adjacent to the lecture theatre. It was a happy idea to give members an opportunity of roving about and examining these features when the display was over. There is, for instance, the new Committee Room which, on the removal of folding partitions, becomes part of the lecture theatre. A table illumination of 50-foot-candles is provided by concentrating louvred fittings. This room is also intended to serve as a demonstration of school lighting. The new shop lighting demonstration room—a result of the recent visits of Mr. W. J. Jones and Mr. H. Lingard to the United States—embodies a snappy modern shopfront with a window showcase of unusual form and a façade of glass bricks. Equally interesting is the new display counter showing at once how lighting can be introduced to assist the display, and how much more effective, from a selling standpoint, is this new arrangement, as compared with the conventional exhibit of objects behind glass.

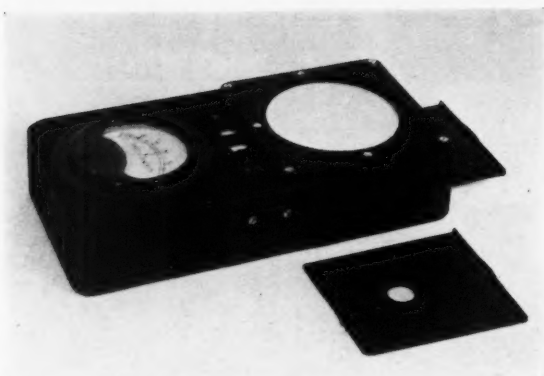
The changes bear witness to restless energy and enterprise of the manager, Mr. W. J. Jones, and the ingenuity of Mr. R. O. Sutherland, who has been responsible for the main architectural features of the new scheme.

## FLUORESCENT TUBE LIGHTING AT MALDEN MANOR STATION.

The development covered by the second item on the programme, Mr. A. Cunningham's description of the new lighting at Malden Manor station, has already been recorded in this journal (August, 1938, p. 193). It may be recalled that the platforms are lighted by two lengths of fluorescent tubing, yielding respectively pink and blue-green light, which combine to give an approach to daylight effect. The available illumination, 3-4 foot-candles 3 ft. above platform level, is obtained economically, but the installation conveys an impression of general brightness very much beyond what these values might suggest. Present experience suggests that running cost and maintenance costs are reasonable and the method is likely to be applied in other new stations.



The lighted Display Counter in the Shop Lighting Demonstration Room, showing how existing equipment may be modernised by the inclusion of lighting to form part of the display.



A new G.E.C. Multi-Range Photoelectric Photometer.

#### NEW PHOTOMETRIC EQUIPMENT.

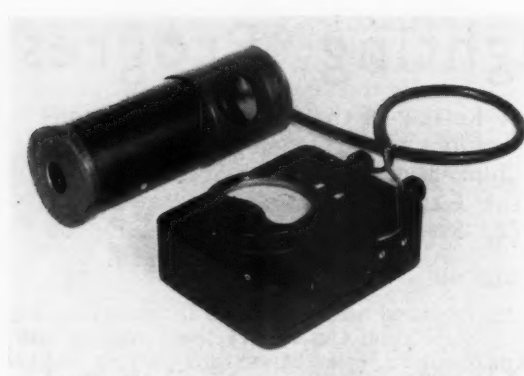
Mr. G. H. Wilson (G.E.C. Research Laboratories) described several new types of photometric apparatus. The first of these, a *New Multi-range Photoelectric Photometer*, has a basic range of 0 — 50 ft.c., but ranges up to 5,000 ft.c. or over can be provided without the above illumination on the photo-cell being exceeded. Furthermore, measurements can be made with light incident at large angles of incidence, yet without the large errors which occur when the cell is used alone.

These features are obtained by placing the cell (current from which is read on a micro-ammeter calibrated in foot-candles) about  $\frac{1}{2}$  in. below a diffusing pot opal test-plate, which receives the illumination to be measured and, by transmission, illuminates the cell.

The range is increased by the use of diaphragms placed over the opal plate. The latter serves as a secondary light source illuminating the entire cell-surface with a diversity of only about 2 : 1, even for the smallest diaphragm. The design avoids the undesirable local overloading of the cell which occurs if the range is increased by merely using a diaphragm over its exposed surface. Whatever the angle of incidence the direction in which light falls on the cell is constant, and the errors of the opal test plate are lower than the natural errors of the cell itself.

Calibration is effected by the adjustment of one of a pair of variable resistances shunted across the cell. Operation is by a sunk screw, and the setting of the resistance is read on a scale. A second resistance, in series with the first, is used to adjust for a change in the type of light-source to be measured (e.g., from tungsten to mercury vapour). This resistance is operated by a knurled disc. In a second form of instrument (not here illustrated) the cell and micro-ammeter are mounted separately and connected by a flexible lead.

A second exhibit was a *Photoelectric Brightness Meter* for the measurement of diffusing fittings. A cell arranged at a fixed distance from an aperture of given size can be calibrated to read in terms of brightness provided the whole of the aperture is filled by the bright surface to be measured. The cell is placed at the rear end of a screened tube and the aperture is about 6 in. in front of the cell surface. By inspection, through a side aperture with movable cover, of a glass plate arranged at 45° to the front of the cell, one can ascertain when the surface to be tested does completely fill the aperture. The cell is connected by flexible leads to a micro-ammeter calibrated in candles per sq. in., and the range can be



G.E.C. Photoelectric Brightness Meter for Measurements of Diffusing Fittings.

varied by the use of diaphragms of different sizes. In the instrument shown ranges of 0 — 10 and 0 — 50 candles per sq. in. are provided. Calibration is effected by resistance shunted across the cell in the same manner as the multi-range illumination photometer mentioned above.

Mr. Wilson's third exhibit was a *Long Range Distribution Photometer*.

For the accurate measurement of the intensity from concentrating projectors, such as floodlights, it is necessary to make measurements at long range. A range of 100 ft. has been used in the past, but for very concentrating projectors, even greater distances are desirable. For the determination of the polar distribution of such apparatus this new photometer has been constructed.

The measuring apparatus (usually a photoelectric cell) is placed at the end of a 100-ft. corridor. In order to avoid rotating the unit under test, a system of mirrors is used to redirect light down the corridor. The mirror system, which is inevitably bulky if large apparatus is to be accommodated, has been housed in a room at one end of the testing range.

Light from the unit under test falls on a mirror 30 in. x 40 in., which can rotate through 360° round the unit under test. This first mirror redirects the light on to a second mirror, which in turn reflects it to a third mirror. The third mirror redirects it down the corridor on to the photoelectric cell. In order that light from the first mirror shall always be redirected on to the third mirror, the second must execute a motion as the first mirror moves around the unit under test. This is achieved by a wire drive from the first mirror to the second.

As constructed the apparatus is arranged for the semi-automatic production of polar curves. A second wire drive from the first mirror rotates a circular table on which the polar curve paper is mounted. Above the table is situated a galvanometer connected to the photoelectric cell, and the deflection of the galvanometer spot is marked by hand on the polar curve paper.

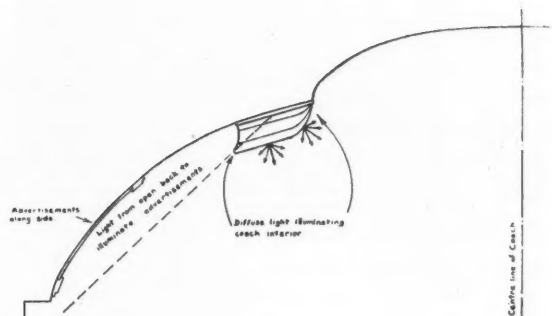
Two hand wheels provide the drive for the rotation of the first mirror, one giving a rotation of 2° per revolution and the other of 10°. A continuous polar curve can be plotted by rotating the mirror slowly and recording the track of the galvanometer spot on the polar curve paper.

The length of the testing range can be increased over 200 ft. by the use of a fourth plane mirror at the end of the corridor. This will reflect light back up the corridor on to a photoelectric cell situated near the operator.



## NEW L.P.T.B. COACH CEILING UNITS.

Mr. W. Imrie Smith (Benjamin Electric, Ltd.) exhibited a lighting unit specially designed for the new L.P.T.B. (Underground) railway coaches. Besides securing a pleasing modern appearance, it was necessary to provide satisfactory illumination for the safety and comfort of passengers. It was also desirable to give good illumination along the lower curvature of the ceiling, devoted to advertising matter. Owing to the limited head room and the restricted wattage of lamps, each detail of design and material had to receive very careful study. The final form evolved and exhibited at the meeting consisted of a fluted glass shape especially moulded in a high grade diffusing glass backed by an "Ali-Tal" reflector having for housing a 50 w. 50 v. lamp. The arrangement, as illustrated in the adjacent sketch, is favourable to even illumination of the advertising area. It is interesting to note that, when viewed by standing passengers, the curvature of the moulded glass assists in relieving any apparent undue brightness of the glassware.



The fittings are mounted along the edge of the central ceiling channel, visible as part of a section of the roof of the carriage. Their openings face the sides of the coach, and they are spaced 4-5 ft. apart, giving well diffused and evenly distributed illumination at reading level and throughout the coach. Direct light from the open backs of the fittings is distributed over the ceiling advertising area without the lamps being exposed to view.

## LIGHT-ACTUATED GAS LAMP CONTROLLER.

The light-actuated gas lamp controller designed by the South Metropolitan Gas Company and exhibited by Mr. W. B. H. Hall serves to light gas lamps automatically when daylight falls below a fixed value and to extinguish the lights when natural lighting again reaches the desired level. In this device the usual timing mechanism of a clock controller has been replaced by a small electromagnet. The movement of the armature of the magnet sets in motion the spring motor which rotates the gas cock. The current used to energise the electromagnet is derived from a small dry cell and is controlled by a rectifier type photo-electric cell operating through a sensitive relay. By the use of a pair of auxiliary contacts in the battery circuit, operated by the spring motor, the device can be actuated by a small electric current flowing for a very short time so that the whole of the electric energy can be supplied from a small 3-volt dry battery which lasts for a considerable time. The use of these auxiliary contacts also ensures that no sparking takes place at the relay contacts. In this way, either internal or external lamps may be controlled. The unit demonstrated was manufactured by Messrs. Wm. Sugg and Co. and fitted to one of their six-light No. 2 upright Rochester street lamps.



This model show-window, exhibited at the meeting, contained a panel of white Thermolux which, by the aid of three sets of three 60 w. lamps, could be adjusted to yield red, amber, ivory or tangerine light.

## A NEW INDUSTRIAL GAS UNIT.

Mr. A. R. McGibbon demonstrated a new industrial gas lighting fitting. He pointed out that the general design of the reflector and lighting characteristics followed the usual lines of such fittings. The unit incorporates, however, several interesting features to facilitate maintenance. The reflector is immediately detachable and carries with it a globe so that cleaning may be carried out with ease. In addition, the entire burner is instantly removable so that this may be cleaned when necessary at ground level. Shielding the primary air intake are two gauze filters which prevent the entry of dust in fluff-laden atmospheres experienced in textile work.



## THERMOLUX GLASS PANELS.

Mr. E. G. Elton (Thermolux Glass Company) illustrated the use of Thermolux material in the form of a panel behind which coloured lamps can be combined to illuminate a shop-window. He explained that such panels utilise a layer of fibres made of colourless glass between two retaining sheets of clear glass, which acts as a diffusing material and appears white to the eye. Such colourless glass will diffuse light falling upon them, but transmit any combination of wavelengths without the colour of the emergent light being materially altered. One use to which such panels can be applied is the combination of overtransom windows and fascias of shops in units illuminated from behind either by point-sources in reflectors or tubular lamps. The eye is then presented only with a surface of colour, and the bulb or tube becomes a hidden source of illumination. The brightness of the surface will naturally be adjusted according to local conditions. Panels up to 70 sq. ft. in area can be prepared. For shop-fronts their use can be extended to large advertising surfaces.

#### AN AUTOMATIC CUT-OFF VALVE.

Mr. A. F. Hedges (Public Lighting Section of the Gas Light and Coke Company) demonstrated an automatic cut-off valve, manufactured by William Sugg and Co., Ltd. He recalled the statement that in the event of a gas-illuminated bollard being accidentally knocked over by a vehicle there was a possibility of the escaping gas being ignited. Although, in his experience, this danger had never occurred, his company felt that it was a matter requiring attention.

The function of the valve is to automatically cut off the gas supply immediately the stand-pipe is fractured, and by means of a model he demonstrated how effectively the valve operated. The valve is fixed in the base of the bollard, preferably below ground level and between the service and the supply to the burner. An easily broken nipple immediately above the valve ensures that the valve will never be broken away from the service in the event of the bollard being knocked down. The device is diaphragm operated, inlet gas passing to the underside of the diaphragm and then through the valve to the burner. Pressure at the burner is conveyed to the upper side of the diaphragm by a small tube so that under ordinary conditions almost equal pressure exists both above and below the diaphragm; thus the valve is kept open by its own weight. Immediately fracture takes place the pressure above the diaphragm is reduced to atmospheric so that the inlet pressure beneath the diaphragm causes the valve to close. Upon restoring connections the valve immediately resets itself.



(Left)—  
A Demonstration shows that there is no escape of gas after column has been "broken."



Showing Automatic Cut-Off Valve applied to Gas-lighted bollard.

#### A REMOTE CONTROL SYSTEM FOR GAS LIGHTING.

Mr. A. R. McGibbon also demonstrated the Sugg-Horstmann "Comet" Remote Control System. He briefly recalled the operation on the "Comet" igniter which dispenses with the permanent by-pass. Previously it has been necessary to place the controlling cock or clock adjacent to the "Comet" in order to prevent an air-gas mixture or air collecting between the "Comet" and the control point and so preventing ignition.

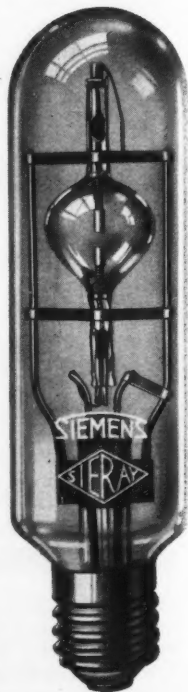
In the system described, each lamp is fitted with a small remote valve which is capable of sealing that section of the main between the valve and the controlling cock. Due to natural diffusion and the possibility of small leakages in lengths of main, it is necessary in order to prevent the entry of air in the mains to maintain a pressure slightly higher than atmospheric. This is achieved by providing a governed shunt around the controlling cock so that when the cock is closed the micro-governor ensures a pressure not exceeding 0.5 inches water gauge in the main. The micro-governor is incorporated in the design of the cock, whilst the small remote valve attached to the lamp is provided with connections for "Comet" ignition apparatus.

The demonstration set was naturally confined to narrow limits, but it was pointed out that there was practically no limit to the length of main to which this device was applicable; thus large numbers of lamps could be controlled from a single point without by-pass consumption.

#### NEW 500 WATT ELECTRIC DISCHARGE LAMPS.

Interesting new types of electric discharge lamps were shown by Mr. J. E. Lane (Siemens Electric Lamps and Supplies, Ltd.). A new 500 w. Aero flood lamp, tubular in shape and capped at both ends, has an inner tube of quartz of approx. 8 mm. bore. The arc length is approx. 100 mm., and the arc approaches a line source of light. Current control is effected by a leak transformer giving an open circuit secondary pressure of 800 v. and a running value of 450 v. The initial efficiency is 50 lumens per watt and the life 500 hours. This lamp is intended primarily for the flood-lighting of aerodromes, where critical control of the light is essential.

Another exhibit was a 500 w. compact air-cooled lamp designed for projector use. The inner tube is of quartz and of the shape illustrated, and the arc length is only 4 to 6 mm. When the arc stabilises there is a ball of light with a brightness of about 20,000 candles per sq. cm., as compared with 150,000 candles per sq. cm. for the sun. Such lamps operate with specially designed choke coils at an initial efficiency of 45-50 lumens per watt and a life of 500 hours.





#### FURTHER DISCHARGE LAMPS AND SPECIAL EQUIPMENT.

A variety of new types of electric discharge lamps and special equipment was shown by Mr. R. P. Sayers (Philips Lamps, Ltd.). These included the "Philora" 80 w. and 125 w. fluorescent lamps fitted with G.E.S. caps and having standard interiors for this size of lamp—as are also used for lamps of the Pearl and Black Glass bulbs now being issued. There was also a special aerodrome landing field projector housing two 1,000 w. mercury lamps, each having a light output of 40,000 lumens and a brightness of 1,400 candles per sq. cm. The maximum candlepower is over 450,000 candles and the unit gives a fan-shaped beam with a vertical angle of approximately 5°. The effect of this unit was very impressive.

Other new units included a novel form of housing for the "Philora" 500 w. water-cooled mercury lamp, previously shown before the society, and a compact form of reflector with chamber above, accommodating choke coil and condenser (here illustrated), applicable to industrial lighting.

Mr. Sayers also briefly presented the Philips visibility meter, which enables a comparison of the road brightness of different street-lighting installations to be readily made.

#### FLUORESCENT WALLPAPERS, ETC.

Perhaps the most interesting of the various items comprised in Mr. Sayers's exhibit was the display of wallpapers coated with materials which fluoresced vividly in the radiation from 125 w. mercury ultra-violet lamps. The contrast in appearance when viewed by ordinary visible light and by ultra-violet radiation was most striking and the range of colours obtainable very great. There would seem to be a definite field for such effects in connection with decorative lighting.

Later in the evening there was another exhibit illustrating fluorescent effects by Mr. C. R. Bicknell (Siemens Electric Lamps and Supplies, Ltd.). This took the form of model figures, animals, flowers, foliage, etc., housed in a small chamber and treated with fluorescent pigments, which gleamed in various colours when illuminated by a single 125 w. Sieray ultra-violet lamp. Movement of the figures was introduced by a chain drive actuated by a synchronous motor.

#### PICTURE LIGHTING, TRANSPARENCIES, ETC.

The display by Paymaster-Captain Robert Hoare, R.N., which can only be briefly summarised, included a variety of interesting exhibits all illustrating new methods of lighting surfaces, such as pictures, posters, transparencies, etc.

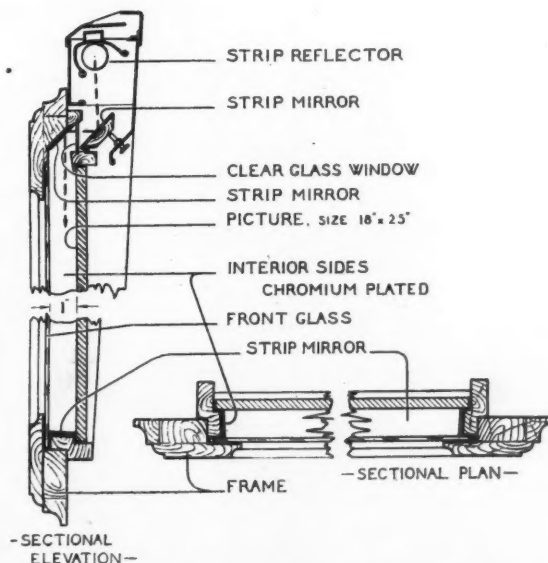
The adjacent diagram shows the essential features of the arrangement applied to the lighting of pictures, of which a good example was shown. This was an actual framed glazed picture. A narrow glass mirror at the base and narrow polished aluminium strips at the side, all concealed from view, produced an effect of strong lighting. It was pointed out that the idea could be applied to quite large areas. The appearance of the picture shown, a view of a ship at sea, was very striking, and photographs showing comparative effects with a picture as ordinarily seen and as revealed when lighted externally by this system were exhibited. Other models showing the application of the method to a large case of medals, and to



An Industrial Reflector with special top for housing 250 w. "Philora" mercury lamp, and accommodating choke coil and condenser.

objects set out in trays, etc. Another possibility was the treatment by similar means of transparencies such as ordinary paper pictures, designs, or advertisements treated with oil.

Diagrams explained the exhibitor's methods for the natural lighting of a picture gallery, based on a plurality of reflecting baffles in the roof, giving diffused and even distribution of light at various solar altitudes, and for certain ingenious methods of producing illusions—such as a mirror which spells out or discloses some design as a person or vehicle moves relatively to its position.



Showing the main features of the special system of lighting pictures demonstrated by Paymaster-Captain Robert R. Hoare, R.N.

#### "ALI-TAL" HIGH BAY UNIT.

Mr. Imrie Smith (Benjamin Electric, Ltd.) illustrated the application of "Ali-Tal" materials to lighting fittings. For some time metal surfaces with efficient diffusing properties have been available. The advent of a special aluminium anodising treatment (such as Ali-Tal) makes possible the design of all-metal fittings with efficient specular reflection, which is maintained under practical conditions in regard to temperature, exposure to the atmosphere, etc. The "Ali-Tal" High Bay Unit exhibits these qualities. It is designed for a 1 : 1 spacing ratio and is intended for the illumination of high bays where more rigorous light-control than is attainable with diffusing types of reflectors is desired. The body, composed of "Ali-Tal," is provided with a clip-on dust-proof vizor, which helps considerably towards maintaining light output between periods of cleaning—an important feature in fittings installed at rather inaccessible heights.

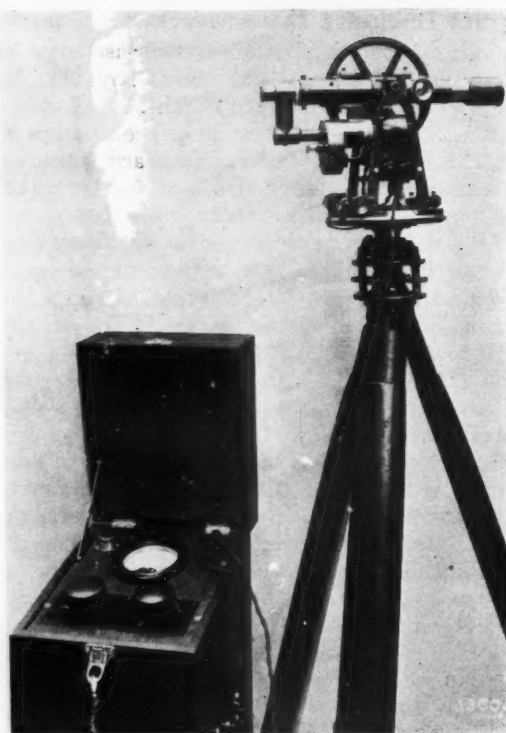
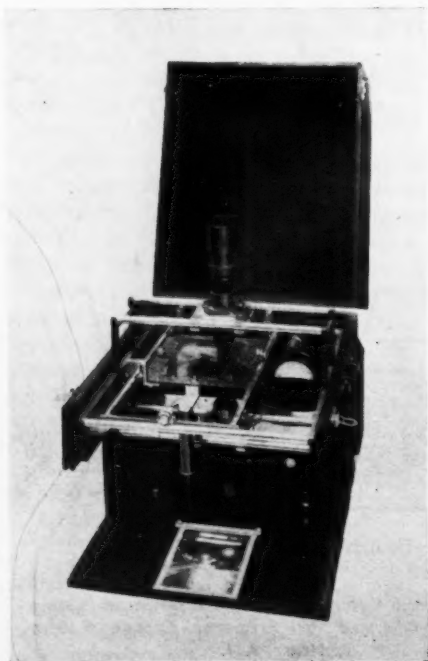
Another standard feature incorporated in the unit is the heavy duty top. This is a development of the familiar "Saaflux" fitting, whereby lamp and fitting can be readily detached for cleaning purposes, but the reflector is attached to the top flange by a large diameter screwed collar, locking the reflector into place and forming a seal that is weatherproof and almost gas-tight.

#### A TELE-BRIGHTNESS METER.

This instrument, shown by Mr. R. Maxted (B.T.H. Research Laboratory), is for the measurement of the brightness of distant surfaces, and is especially suitable for street-lighting work.

The meter is a converted theodolite in which an image of a comparison surface is imposed on the field in place of the normal stadia hairs. The brightness of the comparison surface is varied by means of an iris diaphragm, over a basic range from 100 e.f.c. to 2.5 e.f.c. Four other ranges—10 to 0.25, 1 to 0.025, 0.1 to 0.0025, and 0.01 to 0.00025 e.f.c.—are provided by rotating suitable neutral filters into position by means of a knob. Colour filters are operated in a similar manner, giving colour matches for mercury, sodium, tungsten, and gas sources.

The instrument shown is the latest model of one which has been in use for a considerable time and which has proved very satisfactory in service. It is readily converted for use as a theodolite in measuring the angular separation of sources.



The Tele-Brightness Meter.

#### HOLOPHANE "DUBLIN" LANTERN.

Mr. E. Stroud (Holophane, Ltd.) explained that this lantern and refractor have been designed to the specification of Mr. F. Algar, of the E.S.B., for the lighting of O'Connell-street, Dublin. This street has an average width of about 100-120 ft. from kerb to kerb. Consequently, a light-distribution had to be obtained very different from that which is usual on roads of ordinary widths. One of the stipulations was that the light sources had to be mounted above the kerb. Lighting points down the middle of the roadway were not possible, so that the whole width had to be illuminated from the sides. A suitable light distribution was arranged by means of a specially designed three-piece refractor, comprising a two-piece smooth exterior dome refractor and an enclosing lower bowl. This is housed in an all bronze lantern with diffusing glass panels and base. A simple and robust filament adjustment is provided and also a built-in drip proof connecting box of novel design.

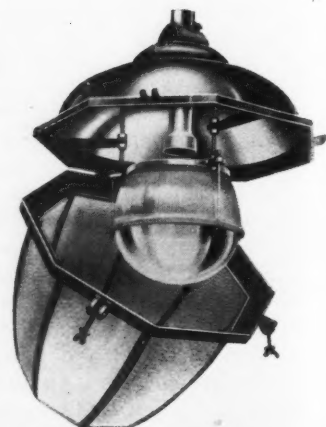
#### A POST-RECORDING BRIGHTNESS METER.

This apparatus, also shown by Mr. Maxted, measures road brightnesses as recorded on a  $\frac{1}{2}$ -plate negative.

A light beam is projected through the negative, and the transmitted beam actuates a photo voltaic cell. The plate is supported on a carriage which also carries an optical tube projecting a spot of light on to a contact print taken from the negative. As the exploring beam is moved its location is indicated on the print.

The main optical system provides for the projection of a beam the diameter of which can be varied from 0.007" to 0.08". The beam is collected by a second optical tube and is thrown on to a photo voltaic cell which operates a micro-ammeter.

The apparatus is used for the measurement of road-brightness and the drawing of brightness contours.



The Holophane "Dublin" Reflector Lantern.



#### A NEW HORIZONTAL REFRACTOR UNIT.

Mr. Stroud also exhibited a horizontal mercury lamp refractor of novel design in which there is a light control of practically 360° round the lamp. The refractor is of approximately cylindrical form and has the luminous column of the mercury lamp located near to and parallel to the axis. Throughout the zone below the horizontal there are internal curved diffuser-refractor prisms, while above the horizontal for a short distance the standard redirecting prisms are used. Both these sets of prisms help in procuring the direct light distribution from the fitting.

From a certain point upwards groups of prisms are arranged directing the light on to the upper reflector in such a way that it is reflected into useful directions. A few shallow external prisms round the end of the cylinder concentrate the widely emitted light into the direction of the roadway, causing the whole cylinder to appear luminous when viewed from the roadway.

#### A NOVEL MEANS OF ILLUMINATING A PILASTER NICHE.

A small scale model was exhibited by Mr. Harold Bright to show the practical solution of a difficulty which had arisen in lighting a niche which was about 4 ft. in height and 2 ft. in width, being semicircular on plan. The top was domed and there was no front edge behind which lamps could be concealed. The bottom was formed by a concrete slab formed above a fireplace which prevented any ordinary lighting equipment being installed. It was decided to make the bottom of the niche from a  $\frac{1}{2}$  in. sheet of polished alabaster which was fixed 1 in. above the concrete slab. In the intervening space a grid of 11 mm. Cleora tube was installed, which gave a rose-coloured light. The effect obtained was very satisfactory, the intensity of illumination at the top of the niche being 8 ft.c. and the heat produced was extremely small.

#### A PENDANT INCORPORATING NEON PILOT LAMP.

A small drum-shaped pendant was also shown by Mr. Bright which was provided with two 25 watt Tungsten lamps inside the body and a 5 watt neon lamp projecting half way through a hole in the bottom. The fitting was intended for use in halls or on bedroom landings of private houses. The neon lamp is arranged so that it is not switched and burns continuously day and night, the consumption being under 45 units per annum, which, on the two-part tariff usually available in private houses, makes the running cost negligible. By this means a little light is always available at night and there is no need for complicated two-way switching outside bedroom doors. The presence of the light when the house is unoccupied also acts as a deterrent to burglars.

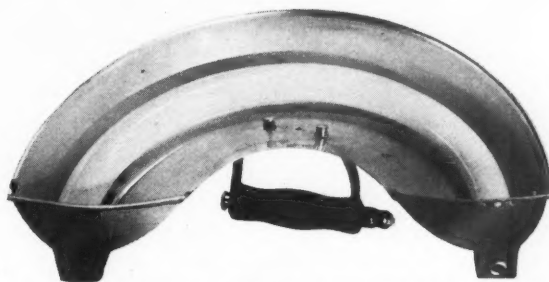
#### A NEW PROJECTOR FOR PICTURE LIGHTING.

Mr. Bright's third exhibit was a small projector designed to take 12 volt, 36 or 48 watt lamps and included a number of novel features. An

ingenious arrangement was provided whereby the shape of the beam could be quickly altered so as to fit any size of rectangular picture even though the beam was thrown at an extremely oblique angle. Precision adjustments are provided for the swivelling and tilting movements, and the projector, which is only 5½ in. high overall, is arranged for mounting direct on a conduit box. The optical efficiency is very high, largely as a result of the careful design, which has even been extended to the lamps which are specially made for use with it. The projector front is screwed to take a series of interchangeable lenses.

#### AN INGENIOUS DENTAL LIGHTING UNIT.

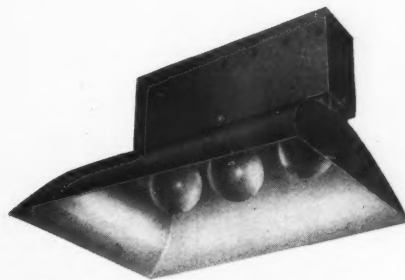
The exhibit of Mr. S. Anderson (General Electric Company, Ltd.) included several interesting items. There was the ingenious dental lighting device, illustrated below, in which use is made of a curved



A G.E.C. Dental Lighting Unit incorporating an Osram architecture lamp.

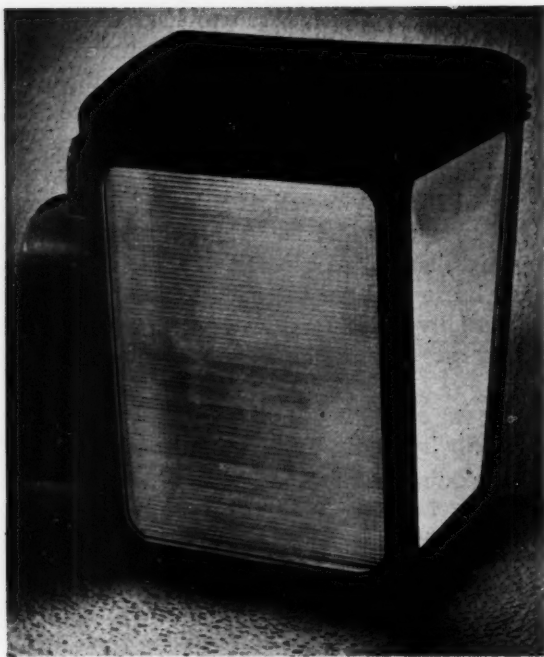
tubular lamp, a fitting specially adapted to the lighting of garage pits, and a combination fitting for hospital wards, capable of furnishing both a moderate diffused lighting for general purposes and a very subdued night-light effect. A fourth handy device was the combination shop-window lighting reflector in which two 150 watt filament lamps and one 80 watt discharge lamp are included, so as to furnish a highly efficient and approximately white light.

Other apparatus shown subsequently by Mr. D. S. Hart and Mr. G. S. Barrett (General Electric Company, Ltd.) included several new types of lanterns and a 2 kW. studio lighting unit. There was also



G.E.C. T.O.T. combination shop window lighting reflector arranged for two 150-watt Osram and one 80-watt Osira lamps.

a very effective demonstration of the action of glass prisms in controlling the path of rays of light in street lighting equipment, etc.



G.E.C. "Horizal" Street Lantern.

The street lanterns included the "Wing," an open type directional unit intended for side street lighting, which can be used either with filament lamps up to 200 watts or with the new 80 and 125-watt discharge lamps. Alternative reflectors giving a magnification higher than 4 : 1 can be furnished if desired.

The "Horizal" lantern shown above is designed for 250-watt and 400-watt discharge lamps, burning horizontally, and is totally enclosed. The sides facing up and down the road are furnished with prismatic glass plates cemented together so as to have smooth inner and outer surfaces. Above the lamp is a magnetic deflector of low consumption, which deflects the arc downwards. A novel method of suspension is adopted, allowing the lantern to slide on to a horizontal bracket arm, which is then gripped in the boss of the lantern by two draw-bolts.

The illuminator shown has been designed for use with a 2-kW. flat grid filament bi-post projector lamp. It embodies a lens specially designed to give



G.E.C. 2-kW. Studio Effect Illuminator.

maximum intensity in the spot position and eliminate spill light, and an illumination of the order of 4,500 ft.c. over an area 8 ft. in diameter can be obtained at a distance of 10 ft. The apparatus is very convenient to manipulate and weighs only 40 lb.

#### NEON LETTERS AND FLUORESCENT TUBING.

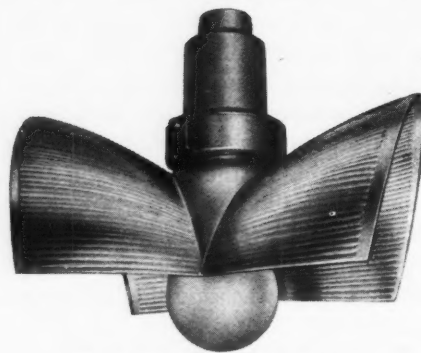
Mr. R. T. Jones (Pearce Signs, Ltd.) displayed several interesting recent products, including the firm's "Classic Letter" and some examples taken from the colour range of high intensity Fluorolume tubing.

The Classic letter was evolved as a departure from the conventional flat-faced teak and recessed metal letter, with a view to improving the daylight appearance of a neon sign.

It is of built-up metal construction, trough sectioned, and carries a proportionately wide bevel around the edge of the letter. When finished in colour, the bevel is carried out in gold leaf, which enhances the appearance and aids legibility. The halation from the tubes fitted to this type letter is confined to the trough, giving greater legibility from a distance and a truer shape to the letter.

The Classic letter lends itself equally well to single and double outline tubing.

The other exhibits illustrated the wide range of colour now available from discharge tubing. It was explained that difficulties involved in the application of fluorescent powders to tubes of small diameter had been completely overcome, and that they resisted extremes of temperature very well.



The G.E.C. Wing Type Reflector.

#### A COMBINED LIGHTING AND VENTILATION PROBLEM.

Mr. B. F. W. Besemer drew attention to the difficulty involved in disposing of unwanted heat in installations where illuminations of a relatively high order (30, 40, or 50 ft.c.) were provided.

He mentioned a case in his experience in which it had been found desirable to produce strong illumination in the window area of a showroom. A bank of nine 500-watt floodlights had accordingly been substituted for the 200 watts originally employed. As the showroom was already somewhat stuffy in hot weather some special means of ventilation were necessary. Exhaust fans as ordinarily arranged would cope with the general lighting, but the rate of air movement to cope with the extra 4½ kW. in the window would be too rapid to be comfortable.

Mr. Besemer described with sketches how the difficulty was overcome. The wall above the window was cut away and a louvred screen was put in its place. The floodlights were mounted behind a screen, and exhaust fans were installed. As matters were arranged the only heat that entered from the 4½-kW. installation was radiant heat—all the convected heat was carried away from the showroom.





*Lighting for Messrs. Small & Parkes Ltd., designed by the Crompton Illumination Service in co-operation with the contractors responsible for the installation.*

*Photograph by courtesy of Messrs. Small & Parkes Limited.*

## A FREE SERVICE FOR LIGHTING ENGINEERS

The lighting demands of industry and commerce are increasing daily. Surveys are waiting to be made. New installations have to be designed. The advertising of the E.D.A./E.L.M.A. and the requirements of the new Factories Act have brought home to big light users the vital necessity of adequate lighting. To help many busy lighting engineers to keep pace with this rapid expansion the Crompton Lighting Service has been created.

Here is an organisation whose resources you can draw on at all times without charge. Trained lighting engineers are at your service.

They will gladly give you any help and advice you may require and are always ready to make surveys and recommend lay-outs. The photograph above shows one of the many installations carried out in this way in co-operation with independent lighting engineers or contractors.

Why not get in touch with Crompton's before tackling your next important job? It places you under no obligation. The Crompton service exists solely to help you to provide efficient and economical lighting through the efficiency and economy of Crompton Lamps.

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**Bush House, London, W.C.2. [Prices Now Reduced]**

### AUTOMATIC COLOUR-CHANGING APPARATUS.

Mr. A. Mansell (Edison Swan Electric Company, Ltd.) showed an automatic colour-changing projector. This has been developed to simplify colour-changing floodlighting schemes where hitherto it has been necessary to use separate banks of projectors for each colour required, and, in addition, somewhat complicated and expensive flasher or dimmer controls for operating the various banks of projectors.

This new projector comprises a robust copper case fitted with cast aluminium sides. This, together with the cast aluminium control gear box, is fixed to an adjustable mounting. Training can be effected between 0-90° of the vertical. In this apparatus the light source employed is a 500 watt-1,500 watt Royal "Ediswan" line filament projector-type lamp, behind which is fixed an anodised aluminium reflector. Alternative types of reflectors for wide or narrow angle projection are available.

Surrounding the lamp and projector is fitted an octagonal shaped frame constructed from cast aluminium members, and within this frame are fitted four different sets of glass colour screens. The octagonal colour frame is supported at one end to the face plate of a friction-operated clutch, the other side of this clutch being connected to the counter shaft of a reduction gear which is driven by a synchronous fractional horse power motor. The motor, reduction gear, and fuses are enclosed in the cast aluminium case fitted at one side of the projector body.

Fitted within the projector housing is a solenoid operated catch which can be locked at any given position on the rotatable colour frame. The solenoid operated catch can, of course, be brought into action by a manually operated switch, but where a bank of projectors is employed and a large variety of effects are required, the solenoids would be electrically connected through a very simple mercury contact controller. If, however, only four distinct colours, together with four colour blends, are desired, then it is necessary to employ an auxiliary device for controlling the colour-changing mechanism.

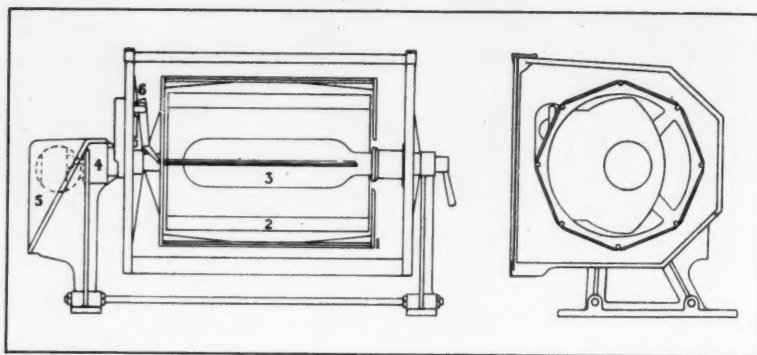
Apart from the floodlighting of buildings, there is a wide application for this class of projector in connection with the illumination of fountains and spectacular schemes for exhibition purposes, etc.

### UNDERWATER LIGHTING PROJECTOR.

Mr. F. M. Cocksedge demonstrated the "Neptune Minor" projector, a useful addition to the range of Ediswan apparatus already available for underwater lighting. The body of this projector is cast aluminium throughout, and the detachable glazing frames are designed to accommodate the special rubber gaskets and armour plate glass fronts necessary for submersible equipment. Heavy cable glands are fitted at the base of the unit, and in addition a special breathing device is incorporated to prevent the serious strains which would otherwise be set up.

### WESTON ILLUMINATION PHOTOMETERS.

Sangamo Weston, Ltd., showed specimens of the Weston illumination photometers and lightmetres, which are available in several forms, including the lightometer, which is very small and compact and weighs only 12 ounces, and the illumination meter which is an instrument of higher grade equipped with a separate searching unit in which the photonic (light-sensitive) cells are mounted. Attention was drawn to the special qualities of the photonic cell which gives a practically linear response to illumination and is of a very permanent character. By using



### NEW WALL FITTING FOR GAS.

Messrs. Wm. Edgar and Sons exhibited a new form of wall unit designed in response to a demand for a neat and modern gas fitting for secondary lighting in

cinemas, hotels, etc., but also suitable for domestic use.

In its standard form it is fitted with a loose key nursery cock, but can be arranged for control by push-bar switch or distance control. It is finished in chromium plate or coinage bronze with flashed white opal glass cylinder. The burner is a single inverted bijou with permanent by-pass, gas, and air regulators, all easily accessible.

its overall height is 7 in., its width 3½ in., and projection 4 in.

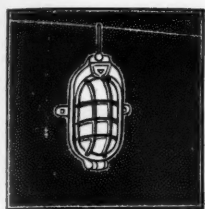
a special visual correction filter a curve of sensitivity closely approaching that of the human eye can be obtained.

Specimens of the Sangamo time switches, applicable to the control of street lighting, shop window lighting, neon signs, and other circuits, which are of a very adaptable and compact nature, were also shown.

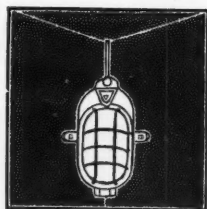


Weston (Model E.603) Illumination Meter.





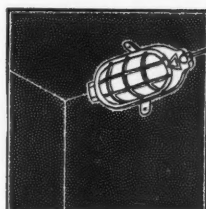
Mounted on a wall surface.



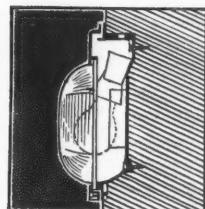
Mounted in a corner between two walls.

### PRISMATIC BULKHEAD FITTINGS

New and compact types which can be used in various positions.



Mounted in a corner between wall and ceiling.



Semi-recessed type sunk in wall, and so occupying a minimum space.

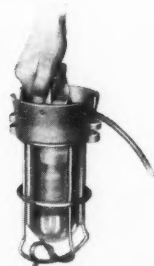
Mr. H. S. Allpress (Simplex Electric Company, Ltd.) described the "Prismax" Bulkhead Fittings, illustrated above. He drew attention to the high overall efficiency and good light distribution over an angle of 180° (unduly narrow streaks of light being avoided), a result of the careful design of the prismatic glass used. The bulkhead incorporates a stainless steel reflector with adjustable legs which enable it to be mounted in various positions as shown above. Other types for semi-recessed mounting are available. The unit is very simply dismantled.

Mr. Allpress also showed a new water-tight hand lamp with folding handle in aluminium alloy which can be either stood on a horizontal surface or hooked on to a suitable projection. If placed on the floor it is not liable to fall over owing to the weight of trailing cables. The new lamp complies with the H.O. regulations. The vibration-proof lampholder provides for earthing, and the lamp is of a very robust type.

Other exhibits included a new fitting for use in cells in prisons and in asylums, etc., consisting of a

fabricated steel box which can be sunk in the walls of a building and locked by a secret key fastening. The whole front is then smooth and free from hinges or projections, and the toughened glass cannot be broken, even by hammer blows.

Finally, Mr. Allpress showed the Simplex "Refrax" Lantern, incorporating a new single piece



Pendant position showing handle.



Showing hanging hook in use.



In standing position showing handle folded out of the way.



The above illustration shows a modern gas fitting exhibited by Messrs. Falk, Stadelmann and Co., Ltd. Fittings utilising five, three, and two lights with glass dishes are available. Each dish is evenly illuminated by a three-light "Bijou" cluster burner with bypass. The cocks are concealed in the arms of the fittings. The dishes are easily released for maintenance; they are not fixed by screws. They are made in satin, rosaline, and champagne opal glass. The metal work may be chromium plated and ivory, green or red, or, alternatively, toned bronze.

bowl refractor for use with 80-watt and 125-watt lamps. The lantern is of dust-proof construction with external focusing, and is designed to meet the requirements of the M.O.T. for lighting Group "B" and, in certain circumstances, Group "A" traffic routes.

### OTHER EXHIBITS.

The exhibits covered in the concluding items of the Exhibition included a demonstration of the Universal (Kingland) Clock Controller by the Gas Meter Company, Ltd., and an exhibit of Brimax Gas Street Lamps by W. Parkinson and Co., Ltd.

Mr. H. L. Juliusburger briefly explained the "General Lighting Information Service" ("G.L.I.S."), which is a Press service mainly concerned with lighting, and has been previously mentioned in this journal, "The Bulletin" (issued ten times per annum), contains a condensed tabulated summary of information published in various parts of the world, with an index attached to each chapter specifying the sources of information.

### Ali-Tal

We gather that our notice of this new product of the Benjamin Electric, Ltd., in our last issue, did not make this development quite clear, and we are pleased to be able to add the following notes.

Ali-Tal Reflectors are made of aluminium which is finished by the Benjamin Electric, Ltd., by an anodising process, which not only brightens the surface of the metal and actually increases the amount of light reflected, but also preserves it so that deterioration is almost negligible.

The process, which is worked under licence from the British Aluminium Company, Ltd., can be applied on various grades and finishes of aluminium to give varying amounts of specular or diffuse reflection ranging up to almost entirely specular and a reflectivity which is higher than almost any other medium. In addition, the finish is remarkably stable as regards heat, and will maintain its efficiency up to 500° C.

Ali-Tal is now standardised by the Benjamin Electric, Ltd., wherever aluminium is employed in their reflectors.

# Sodium Lighting on the London-Bath Road

Inaugurated at Earley (nr. Reading)  
on October 17th

The First Grant-Aided Public  
Lighting Installation under the  
Trunk Roads Act

The inauguration, on October 17, of the new installation on the London-Bath (E40) road at Earley, by Captain Austin Hudson, M.P., Parliamentary Secretary to the Ministry of Transport, was an event of considerable interest.

Captain Hudson stated that this was an historic occasion—the first instance of a grant made by the Minister under the powers given him by the Trunk Roads Act to contribute towards a new or improved system of lighting on trunk roads. This grant covered 50 per cent. of the cost and subsequent maintenance. The installation, Captain Hudson continued, about a mile in length, is of the latest type as recommended by the Departmental Committee on Street Lighting, and covers the whole of this trunk road in the area of the Earley Parish Council, the County Council, and the Ministry of Transport. He hoped that the example would be followed by many other local authorities.

Captain Hudson recalled that street lighting was originally needed only for the purpose of enabling local inhabitants to move about after dark in comfort and safety. The danger then was not so much from vehicles as from those who went about the streets not on their lawful occasions. That was probably why there was a distinction in law between lighting authorities and highway authorities. Safety has now taken on another aspect with the coming of the fast-moving motor vehicle. In built-up areas the use of headlights is not satisfactory. On the other hand, types of lighting adequate for local purposes may prove dangerous to fast-moving traffic, and where main roads pass through built-up areas more costly modern systems are necessary. Two-thirds of road casualties occur in built-up areas. As a practical motorist he felt sure that the installation of proper systems of lighting in those areas would do much to reduce the dangers to life and limb.

A recognition of the importance of adequate lighting for such main roads was afforded by Parliament when it gave the County Councils powers to assist lighting authorities (under Section 23 of the Road Traffic Act, 1934), and to the Minister his power for trunk roads (Section 6 (4) of the Trunk Roads Act).

"The Minister is ready and indeed anxious to make use of those powers and to contribute to the installation and maintenance of improved systems of lighting on all trunk roads. He hopes sincerely that the lighting authorities will recognise the great advantage of these modern systems and will co-operate in this matter, which is of such vital importance to the local inhabitants."

Mr. Ben S. Clark, chairman of the Earley Parish Council, thanked Captain Hudson and the Ministry of Transport for their support and acknowledged the services of those concerned with the installation.

The installation consists of 150-W. Philips "Philora" sodium lamps in "Golden Ray" fittings, manufactured by the Engineering and Lighting Equipment Co., Ltd., who were responsible for the planning of the scheme. The units are mounted 25 ft. high and 120 ft. apart on concrete standards, and have a projection of 2 ft. 6 in. The control gear is housed in the base of each column. The installation is controlled by the d.c. bias system of the Standard Telephones and Cables, Ltd., and energy is supplied by the Wessex Electricity Co., Ltd.



A Night View of a section of the London-Bath Road at Earley, Berks, lighted by 150 W. Philips "Philora" Sodium Lamps in "Golden-Ray" fittings—the first lighting scheme to receive the M.O.T. grant under the Trunk Roads Act, 1936.

## Public Lighting at The World Power Conference

(Continued from page 242, October, 1938)

It will be recalled that in our last issue we summarised the first portion of Mr. W. J. Jones's paper at the above Conference. Dealing subsequently with other general features of public lighting he suggested, as typical figures for consumption: Shopping centres, 20-60 k.w. per mile; traffic routes (Group A), 6-15 k.w. per mile; and side streets (Group B), 5-10 k.w. per mile. With all-night lighting (about 4,000 hours per annum) the load factor approaches 50 per cent., and the charge for electricity should not exceed 3d. per unit.

Mr. Jones touched upon the familiar administration problems and such special questions as parade lighting and the lighting of tunnels. For the Liverpool-Birkenhead tunnel, 4,618 metres long, there is a load of 250 k.w., and a total consumption of 2,194,000 units per annum at 0.46d. per unit, costing £4,400. The influence of town illuminations at Blackpool (where as many as 8,000,000 travelled one year to see the illuminations), Southend and other resorts was briefly discussed. Interesting data were presented for the lighting demands of railways (3,000 k.w. for the Southern, 5,100 for the Underground, 15,000 for the L.N.E.R., and 4,000 for the Port of London) and aerodromes.

The paper by Mr. W. J. G. Davey and A. R. McGibbon on Public Lighting by Gas was mainly statistical. As a starting point the authors recalled the advance in efficiency of gas lighting from the open flame Argand (40 lumens per cub. ft. of gas) to modern cluster inverted burners (240) and the high-pressure mantle (350) with gas of 500 B. Th. U. Notable dates in the history of gas street lighting start from the invention of the mantle (1884) and terminate with the M.O.T. reports (1935 and 1937). Other tables show the numbers of lamps in use in representative cities in 1884 and 1937, and the calorific values adopted. Examination of fifty-two undertakings selling over 1,000 million cub. ft. per hour show values ranging from 450 to 550 B. Th. U.'s over 100,000 millions being sold at 500. Summaries of the B.S.I. Specification for Street Lighting and the M.O.T. reports followed and a useful table was presented showing the gas consumption with various sizes of lamps and spacings for Group A and Group B roads.

The next section of the paper summarised the sales of gas for public lighting in Great Britain. It is interesting to observe that during the period 1920 to 1936 not only has the consumption doubled, but the percentage of gas sold for public lighting has likewise increased—from 2.94 per cent. in 1920 to 4.49 per cent. in 1936. Tabular data are presented showing running costs in various cities and the effect thereon of number and size of mantles, and cost of gas per therm. Final sections of the paper dealt with distribution and with various systems of clock control, pressure control, and ignition.



# BRITAIN'S *first* TRUNK ROAD LIGHTING INSTALLATION

to receive the Ministry of Transport's Approval and Grant

under the Trunk Roads Act, 1936



## ANOTHER "GOLDEN WAY" IS OPENED

Captain Austin Hudson, M.P., Parliamentary Secretary to the Minister of Transport, performed the initial switching-on at the "Green Monkey" Roadhouse, Earley, Berks., on Monday, October 17th. Left to right:—C. J. Howlett, Esq., Vice-Chairman; Capt. Austin Hudson, M.P.; Ben S. Clark, Esq., Chairman; and Mr. H. C. North, Clerk to Earley Parish Council.



London — Bristol A.4 Trunk Road at Earley (Berks).

## "BRIGHTER BERKSHIRE"



MENTAL COMMITTEE FINAL REPORT was inaugurated on Monday, 17th October, in the presence of a large gathering of local authority officials, engineers and representatives of various associations concerned with road safety, lighting and electricity supply.

Philips "Philora" 150w. sodium electric discharge lamps are

This interesting sodium lighting installation, planned in exact conformity with the recommendations of the M.O.T. DEPART-

used in "Golden Ray" refractor lanterns designed and supplied by Messrs. The Engineering & Lighting Equipment Co. Ltd., of St. Albans, who planned the scheme, which was installed by the Wessex Electricity Co. Ltd. These units are spaced 120 feet apart and mounted 25 feet high.

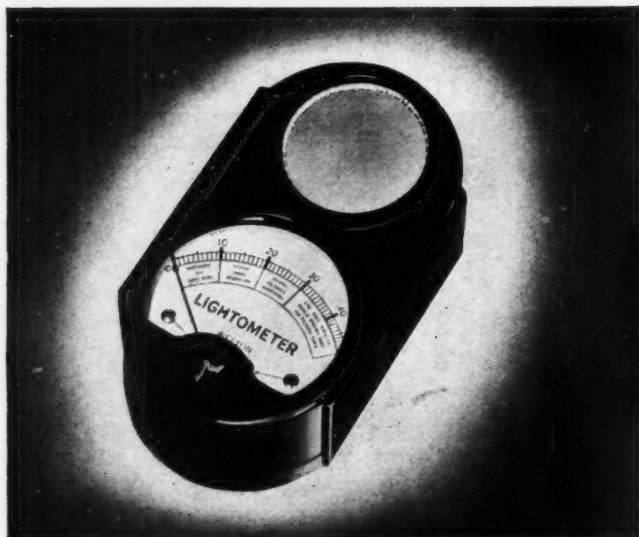
As the first trunk road lighting scheme to receive the M.O.T.'s approval and grant, this installation is an outstanding example of modern road lighting practice and of the excellent visibility and low operating and maintenance charges, characteristic of "Philora" sodium lighting.

# PHILIPS "PHILORA"

SODIUM AND MERCURY ELECTRIC DISCHARGE LIGHTING

PHILIPS LAMPS LTD. ("Philora" Dept.) 145 CHARING CROSS RD., LONDON, W.C.2.

## ***An ideal Light Meter for the Factories Act 1937***



You need an accurate and reliable light meter to assist you to meet the lighting requirements of the Factories Act 1937. The Weston Model E703 Lightometer is an ideal instrument for making rapid checks of interior illumination. It is as easy to read as a watch, its scale being marked both in Foot Candles and with the correct lighting values needed for various locations and types of work. Inexpensive and pocket-size, this instrument will last a lifetime. It is supplied to give readings of 0.50/0.500 F.C. or alternatively 0.50/0.250 F.C. Please ask us for details.

## **WESTON MODEL E703 LIGHTOMETER**

WESTON ELECTRICAL INSTRUMENT CO. LTD.,  
CAMBRIDGE ROAD, ENFIELD, MIDDLESEX.

'Phone: Enfield 3434 (Six lines)

'Grams: Pivoted, Enfield.

## **Remote Control of Street Lighting**

The reference elsewhere (p. 274) to the new sodium lighting on the London-Bath Road, where the d.c. bias system of Standard Telephones and Cables, Ltd., is being used by the Earley Parish Council for the control of the installation, will no doubt interest many of our readers, who may like to know something further of the operation of this flexible system.

For some time there has been an evident and increasing demand for remote control of street lamps, not only on the ground of economy and convenience, but also because of its possibilities for the extinction and lighting up of lamps in times of emergency. There are also many other openings for the use of this selective system—for example, in connection with domestic restricted tariff service, e.g., the switching on and off of water heaters at specified times.

The system adopted at Earley is based on the superimposing on an ordinary a.c. circuit of a low voltage d.c. bias, which is conveniently applied by means of a 6-volt heavy capacity battery. It is an easy matter to provide relays which will respond to this d.c. bias but will remain quite unaffected by the alternating current flowing in the mains. By using six volts as the energising bias and relays that operate at four volts an ample margin of safety for robust operation is secured.

From the master control at headquarters the bias can be applied to turn on and off all street lamps by the aid of units mounted in the base of the street post. By using different "pulses" one can also discriminate between all-night lamps and those switched

off at midnight. Additional services, likewise controlled from headquarters, can operate firemen's units in their homes, can call up air wardens, or can operate air raid sirens. The air warden's unit is conveniently assembled in a compact portable case. In order to make an air raid "alarm" signal incisive it is arranged as two notes repeated in succession eight times whilst the "all clear signal" takes the form of a continuous note maintained for 30 seconds.

## **Reviews of Books**

*The Perception of Light*, by W. D. Wright, D.Sc., A.R.C.S. (Blackie and Son, Ltd., 1938, pp. 100. Price, 6s. net.)

This little book summarises the series of six lectures given by the author at the Imperial College in the autumn of 1937. Those who were fortunate to attend the lectures, and, still more, those who could not do so, will be glad to have the matter available in type. The lectures, indeed, are unique in that they not only survey available knowledge on visual processes, but apply it in a manner acceptable to illuminating engineers, mentioning recent work that has a practical bearing on lighting practice and introducing familiar examples from everyday life. There are in all six chapters. Following an introductory review of visual phenomena, the author deals in succession with vision at high and low intensities, glare and visual sensations. A final chapter summarises certain recent researches, including those of Stiles and Crawford, Lythgoe, and the author himself. The sections dealing with such topics as vision in lighted streets, in fog, in mines, etc., form a useful reminder of the part played by the response of the eye in lighting problems, particularly those where the eye is in a state adapted to weak illuminations. Equally useful is the analysis of the influence of increasing illumination and contrast on the performance of the eye and its application to experience in the home, office, and factory. At the end is a list of sixty-six references, partly physiological, but also relating to D.S.I.R. publications, and a useful index.





## **EARLEY PARISH COUNCIL**

THE first Ministry of Transport assisted Trunk Road Lighting System inaugurated by Captain Austin Hudson, M.P., Parliamentary Secretary to the Ministry of Transport, on 17th October, 1938, incorporated the

## **STREET LIGHTING CONTROL SYSTEM**

supplied by

*Standard Telephones and Cables Limited*

OAKLEIGH ROAD, NEW SOUTHGATE, LONDON, N.11

Telephone :

ENTERPRISE 1234

BRANCHES AND REPRESENTATIVES THROUGHOUT THE WORLD

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## Electric Street Lighting

**Bristol.**—The annual report of the City Engineer reveals that capital expenditure amounting to £13,000 has been expended on street lighting improvement and electrification, including considerable extension in the number of streets lighted with discharge lamps. There are now 7,983 filament lamps and 848 discharge lamps throughout the city. The inclusive cost of the electrified street lighting amounted to £17,936, an average of 0.875d. per unit.

**Irish Free State.**—On behalf of the Dublin Corporation the Electricity Supply Board has begun far-reaching schemes for the improvement of the city's street lighting. The first sections to be relighted are O'Connell and Westmoreland-street, College-green, and Dame-street. Special bronze lanterns are being erected on distinctive standards, with a terrazzo finish. A total capital expenditure of £52,000 will be incurred in the three-year programme. The Electricity Supply Board, which supplies 247 areas, has added 1,583 street lamps to its mains in twelve months, bringing the total to 22,924.

**Jarrow (County Durham).**—Early in September the Mayor, Alderman T. O'Connor, inaugurated the new lighting installation in York-avenue; 39 sodium lamps have been erected by North-East Coast Electric Supply Company, Ltd., at a cost of £1,332.

**Leatherhead.**—By the terms of a new agreement with the J.E.A., all new street lighting erected in the next ten years in the urban area will be electric. The agreement also renews the contract for electric lighting already existing. Arrangements are now in hand for new lighting in Eastwick, Park Drive, and other roads, to be erected in accordance with "Final Report" recommendations for "Group B" roads. The main road through Bookham is to be provided with "Group A" lighting by filament lamps at 25 ft. mounting height.

**Leicester.**—The Watch Committee has decided in favour of complete electrification of the city street lighting, one important consideration, in relation to the city's A.R.P. plans being the ease with which the lighting can be extinguished in emergencies.

**Newton-in-Makerfield.**—The new installation, which has cost £1,935, conforms completely with the Final Report recommendations; 96-100-watt and 150-watt sodium lamps have been used on the A572 which traverses the district—a distance of two and three-quarter miles. The average spacing of standards is 141 ft. Conditions in Crow-lane are illustrated in the adjacent photograph. Earlestown Market Square lighting is being lighted by three posts with two lamps, two posts with single lamps, and conversion of one existing post to take two lamps; 400-watt fluorescent mercury lamps are used.

**Roths.**—At a ceremony on September 1 oil lamps were supplanted by electricity when Provost A. Forsyth inaugurated a new street lighting system throughout the burgh. It was recalled that half a century ago the mere suggestion of providing any light aroused heated controversy.

**Shotton (County Durham).**—Precepts for £3,000 for public lighting were sanctioned at the parish meeting. The amount includes current, £2,402; lamp replacements—mercury, £166 8s.; filament, £19 10s.; establishment, £18.

**Trunk Road Grant.**—The first section of a trunk road to receive the Ministry of Transport 50 per cent. grant is shortly to be placed in commission at Earley, on the outskirts of Reading. This road (A4) is being lighted by forty-four 150-watt sodium lamps spaced 132 ft. and at 25 ft. mounting height, with concrete columns. The Lighting Authority is Earley Parish Council.

## Lectures on Illuminating Engineering

In our last issue we referred to the courses of lectures on Illuminating Engineering initiated in London at the Borough Polytechnic (Borough-road, S.E.1), the Northampton Polytechnic (St. John-street, London, E.C.1), and the South-East London Technical Institute (Lewisham High-road, S.E.4). We also mentioned that courses are being arranged at the University of Sheffield and at the College of Technology, Leeds.

We are now interested to learn from Mr. M. W. Hime, that classes are being run at the Woodside School, Glasgow, where an attendance of over thirty has been obtained.

We hope that these courses, which form a natural development of the initiation of Examinations in Illuminating Engineering by the City and Guilds Institute, will receive support from leading firms in the lighting industry and that they will encourage the junior members of their staffs to attend.

## Sodium Lighting at Newton-in-Makerfield



The above night photograph shows the appearance of Crow-lane East, Newton-in-Makerfield, where 150 w. sodium lamps in "Newton" fittings have recently been installed.

## E.L.M.A. Illumination Design Courses

The thirty-ninth Illumination Design Course which commenced at the E.L.M.A. Lighting Service Bureau in London, on October 10, once more attracted record attendance. The six lectures deal with Modern Lighting Practice (W. J. Jones), Planning Lighting Installations (H. Lingard), Modern Electric Lamps (L. E. Buckell), Factory Lighting (R. O. Ackerley), Shop Lighting (A. D. S. Atkinson), and Architectural Lighting (R. O. Sutherland). Similar courses are being organised in Birmingham, Manchester, Glasgow, Sheffield, Bristol, and Cardiff, each of which has its individual programme on distinctive coloured paper. There is no doubt that the attendances at these various centres will reach an impressive aggregate.

## New Lighting in Ealing



Hanger-lane, Ealing, illuminated by 125 w. Mercra Lamps in B.T.H. County Junior Lanterns. The existing columns were utilised, and fitted with special extension brackets to provide a 16ft. mounting height for the lanterns.



# MERCRA

REGISTERED TRADE MARK

## LAMPS AND BTH STREET LIGHTING EQUIPMENT



Some recent  
installations  
of Mercra "H"  
Lanterns  
include:—

BETHNAL GREEN  
BIRKENHEAD  
COXHOE  
FINCHLEY  
FOLKESTONE  
GRAVESEND  
KINGSTON-  
ON-THAMES  
LANARKSHIRE  
LEYLAND  
LEYTON  
LINCOLN  
MAIDSTONE  
MERTON  
& MORDEN  
ROMFORD  
SLOUGH  
SOUTH SHIELDS  
THORNTON  
& CLEVELEYS  
WHITBURN  
WINDSOR



Kentish Town Road, St. Pancras, illuminated by 400 watt Mercra Lamps in BTH Mercra "H" Lanterns.

The recognised and most successful method of ensuring perfect street lighting is that offered by Mercra Lamps combined with BTH Street Lighting Lanterns.

However extensive or however limited the proposed installation, BTH Lighting Engineers are at your service with schemes and specifications. Please make an appointment.



Richmond Road, Kingston-on-Thames, illuminated by 400 watt Mercra Lamps in BTH Diron Lanterns.

M 3791

THE BRITISH THOMSON-HOUSTON CO., LTD., CROWN HOUSE, ALDWYCH, LONDON, W.C.2.

## ELECTRICAL INDUSTRIES BALL,

Grosvenor House, Park Lane — — — November 22nd

# Literature on Lighting

(Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

(Continued from page 245, October, 1938.)

## I.—RADIATION AND GENERAL PHYSICS.

### 274. Criticisms of the Luminous Field Theory.

A. Blondel. *R.G.E.*, Vol. 44, No. 10, pp. 312-317, September 10, 1938.

M. Blondel criticises the Luminous Field theory advanced by Gersun, with particular reference to the division of space into tubes of light flux. He is in agreement over the value of vector analysis in lighting problems.

W. R. S.

### 275. On a Theory of a Luminous Field.

A. Gersun. *R.G.E.*, Vol. 44, No. 10, pp. 307-312, September 10, 1938.

This forms an attempt to apply to photometry and lighting similar ideas to those underlying a field of force: problems involved can be handled vectorially and graphically. Sections are devoted to the definition of the luminous vector, lines, and tubes of flux and use of the luminous vector.

W. R. S.

## II.—PHOTOMETRY.

### 276. Measurement of the Equivalent Luminous Intensity of Rotating Beacons.

Gerald Kent Neelands, M. K. Lanfer, and W. R. Schaub. *J.Opt.S.A.*, Vol. 28, pp. 280-285, August, 1938.

The paper describes a method of measuring the apparent change in intensity of a beacon as its rate of rotation is altered. The equivalent intensity of several beacons is plotted against the duration of the flash.

F. J. C. B.

### 277. Photometry of Coloured Light Sources.

W. F. Forsythe, B. T. Barnes, and Ann L. Shrider. *J.Opt.S.A.*, Vol. 28, pp. 241-248, July, 1938.

The light output of six different kinds of lamps, viz., 400-watt high intensity mercury arcs, 10,000 lumen sodium lamps, neon lamps, and three kinds of fluorescent lamps, a pink, a green, and a blue, were selected and compared by different photometric methods. A description of the methods employed, and tables showing results, are given.

F. J. C. B.

### 278. Use of Light Flux in Measurements.

L. Quevron. *R.G.E.*, Vol. 44, No. 9, pp. 265-268, September 3, 1938.

Describes an apparatus primarily intended for the measurement of length, but adaptable to other measurements, such as angles. The device depends upon the partial obscuration of an accurately controlled beam of light which falls on a photocell. Explanatory photographs and diagrams are given.

W. R. S.

### 279. Tungsten, Mercury, and Sodium Illuminants at Low Brightness Levels.

M. Luckiesh and A. H. Taylor. *J.Opt.S.A.*, Vol. 28, pp. 237-240, July, 1938.

The relative magnitude of the Purkinje effect, and the effect of a given glare source in reducing these effects is shown for a number of different types of light source.

F. J. C. B.

### 280. An Adaptometer for Measuring the Human Dark Adaptation.

S. Hecht and S. Shlaer. *J.Opt.S.A.*, Vol. 28, pp. 269-275, July, 1938.

An instrument is described with which one can measure the course of human visual dark adaptation under specified but flexible conditions.

F. J. C. B.

## IV.—LIGHTING EQUIPMENT.

### 281. Discharge Lamp Circuits.

G. W. Carter. *El. Rev.*, Vol. CXXIII, No. 3,177, p. 535, October 14, 1938.

Explains the characteristics of discharge lamps, and shows why special precautions must be taken in order to measure with accuracy the energy dissipated in lamp and in auxiliaries. An estimation of the probability of error in the measurement of the energy consumed by an installation of discharge lamps is given.

R. G. H.

## V.—APPLICATIONS OF LIGHT.

### 282. Illumination Levels and Eye Comfort.

W. B. Lancaster. *Magazine of Light*, VII., No. 6, pp. 30-32, September, 1938.

A discussion is given on the personal reaction sometimes experienced as a result of a change of form and intensity of illumination.

C. A. M.

### 283. Better Lighting.

Anon. *El. Rev.*, Vol. CXXIII, No. 3,176, pp. 483-486, October 7, 1938.

Reviews, with photographs, many of the recent developments in home decorative lighting.

R. G. H.

### 284. Light and Architecture.

Anon. *Am. Illum. Eng. Soc. Trans.*, 8, pp. 683-686, September, 1938.

A number of architectural lighting schemes are described, with photographs.

J. S. S.

### 285. School Lighting Demands Attention.

F. W. Frostic. *El. World*, 110, p. 888, September 24, 1938.

The author gives some conclusions on the requirement for adequate school lighting based on an investigation in which students and teachers were able to select their own requirements. He urges co-operation between the educational authorities and the lighting engineers in providing better lighting.

S. S. B.

### 286. Electricity in a Hospital.

Anon. *El. Rev.*, Vol. CXXIII, No. 3,173, pp. 388-389, September 16, 1938.

Describes, with photographs, the novel lighting arrangements in the operating theatre, wards, and research laboratories of the National Hospital for Diseases of the Nervous System.

R. G. H.

### 287. Some Practical Aspects of Lighting Kitchen Work Areas.

J. T. Bailey. *Am. Illum. Eng. Soc. Trans.*, 8, pp. 725-733, September, 1938.

Suggestions are made for the design and location of fittings for local lighting in kitchens.

J. S. S.

### 288. Public Lighting Considerations.

Anon. *El. Rev.*, Vol. CXXIII, No. 3,173, pp. 385-387, September 16, 1938.

Reviews the discussions at the A.P.L.E. conference on the various papers read.

R. G. H.

### 289. A.P.L.E. Conference: Public Lighting Exhibition.

Anon. *El. Times*, 94, pp. 277-279, September 1, 1938.

Gives a summary, stand-by-stand, equipment shown at the recent A.P.L.E. Conference at Bournemouth.

W. R. S.

### 290. Public Lighting Engineers.

Anon. *El. Times*, 94, pp. 313-323, September 8, 1938.

Gives abstracts of papers read at the Bournemouth Conference of the Association of Public Lighting Engineers.

W. R. S.

### 291. Street Lighting and Safety.

L. J. Schrenk. *Am. Illum. Eng. Soc. Trans.*, 8, pp. 687-704, September, 1938.

A detailed analysis of fatal accidents, before and after the installation of new street-lighting equipment in Detroit, is given. The night-to-day ratio of fatalities was reduced from 7 to 1 to 1.4 to 1, and it is concluded that there is a direct relation between night traffic accidents and poor visibility.

J. S. S.

### 292. Bridge and Highway Lighting in California.

W. P. Bear. *Am. Illum. Eng. Soc. Trans.*, 8, pp. 705-724, September, 1938.

A detailed description is given of the lighting of the San Francisco Bridge and approach roads. The influence of this lighting on traffic accidents is outlined, and suggestions are made for the collection and presentation of similar statistical data.

J. S. S.

### 293. Public Lighting Control.

Anon. *Elect.*, 121, p. 419, October 7, 1938.

A description is given of a method of public lighting control in which frequencies ranging between 300 and 800 cycles are superimposed.

C. A. M.



## *It's worth remembering . . .*

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### 294. On the Brightness of Wet Road Surfaces.

M. Cohn and A. Trequigneux. R.G.E., Vol. 44, No. 12, pp. 373-387, September 24, 1938.

An account of a very full research into the reflection properties of wet road surfaces. Photographs and diagrams are given. W. R. S.

### 295. On the Reflection Factor of Clothing.

P. Moon and M. S. Cetti. J.Opt.S.A., Vol. 28, pp. 277-279, August, 1938.

For statistical purposes it was found that the average man in the United States wears a neutral grey suit having a reflection factor of about 4.5 per cent. The reflection factor is essentially the same for all types of light source. F. J. C. B.

### 296. Railway Lighting.

Anon. Magazine of Light, VII., No. 6, pp. 20-21, September, 1938.

Particulars with photographs of lighting on American long-distance trains are given. C. A. M.

### 297. Lighting Mt. Victoria Tunnel, Wellington.

Anon. El. Times, 94, p. 359, September 15, 1938.

An installation of sodium lamps in silvered glass reflectors has recently been carried out in Wellington. The spacing is graded from 10 foot spacing near the ends to 60 foot near the middle of the tunnel, so that a gradual adaptation to natural daylight is obtained in passing into and out of the tunnel. A photograph is given. W. R. S.

### 298. Ceiling Louvres Graduate Light at Tunnel Entrance.

Anon. El. World, 110, p. 861, September 24, 1938.

An attempt has been made in the Broadway tunnel, at Oakland, U.S.A., to provide gradual transition in the brightness of the field of view for cars entering or leaving the tunnel, and thus changing from outside daylight to the tunnel interior or vice versa. An arrangement of louvres was adopted, extending over a distance of 200 feet at each end of the tunnel, the rate of variation of intensity being based on curves giving the rate of opening or closing of the eye pupil. S. S. B.

### 299. Church Lighting.

F. B. Lee. Magazine of Light, VII., No. 6, pp. 12-13, September, 1938.

Three recent church lighting installations are

described, with photographs. In two cases diagrams showing details of the fittings are given in addition.

C. A. M.

### 300. Hotel Lighting.

Lee Warren. Magazine of Light, VII., No. 6, pp. 24-27, September, 1938.

A discussion is given on the requirements of hotel lighting. One suggestion made and illustrated is a table standard for use on dining tables, combining a newspaper or magazine rack with a coloured warning light that may be switched on in order to summon a waiter.

C. A. M.

### 301. Foot-Candles Store Lighting.

Anon. Magazine of Light, VII., No. 6, p. 14, September, 1938.

Details are given of lighting equipment in a jeweller's shop producing values of 150 foot-candles over show-cases.

C. A. M.

### 302. Colour Matching in the Paper Industry.

E. L. Deeter. Electronics, Vol II., No. 9, p. 18, September, 1938.

The author describes an apparatus designed to assist in the matching of printing inks in the paper industry by determining colour matches with high precision by reflection or transmission methods. A photoelectric device is used in the form of a sensitive bridge circuit.

S. S. B.

### 303. Yarn Colour Matched Under Carbon Dioxide Light.

Anon. El. World, 110, p. 711, September 10, 1938.

Details are given of an installation of carbon dioxide discharge tubes, used for colour matching of yarns in a carpet factory. The luminosity curve of the carbon dioxide radiation is compared with that of north sky daylight or of a filament lamp, and details of the operation of the tubes are mentioned.

S. S. B.

### 304. Lighting in Mines.

Anon. Elect., 121, p. 418, October 7, 1938.

A brief description is given of tests, made at the Mines Dept. Testing Station, on krypton-filled and argon-filled miners lamps. Mention is also made of mercury vapour bulbs run at 100 volts for use in certain types of air-turbo lamps.

C. A. M.



# Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

## No. 489,925. "Improvements in and Relating to Electric Discharge Lamps."

*The British Thomson-Houston Company, Ltd.  
Dated May 21, 1937. (Convention, U.S.A.)*

This specification describes a lamp of the gaseous electric discharge type, comprising a tubular sealed envelope containing a gaseous atmosphere, and having electrodes sealed in opposite ends thereof, and a supporting base at one end of the envelope having a pair of leads, one of which is connected to the adjacent electrode of the lamp while the other extends helically about the envelope to a point beyond the discharge path between the electrodes, to make a connection with the electrodes so that the light obstruction produced by the latter lead is uniform in all directions. In the example described the lamp and leads are enclosed within an outer envelope to which the base is fixed.

## No. 490,086. "Improvements in and Relating to Arc Lamps."

*Buckley, H. S. Dated May 7, 1937; June 3, 1937.  
(Cognate provisionals.)*

Instead of the screw mechanism frequently employed for operating the electrodes of an arc lamp, an arc lamp having multiple horizontal electrodes is provided with a trigger, which, when operated, simultaneously displaces the electrodes of a set in the feed direction and, by acting through a connection giving slip or lost motion, effects a return movement of the electrodes, which is less than the feed movement, so that the arc is struck and persists across a gap, the length of which is determined by the amount of return movement.

## No. 490,577. "High-Pressure Metallic Vapour Lamps."

*Vereinigte Glühlampen Und Elektrizitäts  
Aktiengesellschaft. Dated October 31, 1936.  
(Convention, Germany.)*

According to this specification, radiation bodies made of refractory material, such as tungsten, are disposed between the constricted discharge of a high-pressure vapour lamp and the wall of the bulb, so that they are heated by the discharge and radiate red light. The bodies are shaped and arranged to minimise their screening effect on the light of the discharge itself, while, at the same time, they present a maximum radiating surface.

## No. 490,821. "Improvements in Sources of Light for Projection Apparatus."

*The General Electric Company, Ltd., and Wilson,  
G. H. (Communicated by Patent Treuhand  
Gesellschaft für Elektrische Glühlampen  
M.B.H.) Dated February 22, 1937; June 3,  
1938. (Cognate applications.)*

According to this specification, a projector is equipped with a second lens co-axial with the projecting lens, an electric incandescent lamp, and a high-pressure mercury vapour lamp. The arrangement is such that the second lens produces a real image of the incandescent filament coincident with

the discharge column of the high-pressure discharge lamp. The effective light source, therefore, comprises the image of the filament and the discharge column.

## No. 490,933. "Improvements in or Pertaining to Illuminating Projectors."

*Pintsch Aktiengesellschaft, J. Dated January 30,  
1936. (Convention, Germany.)*

This specification covers a vehicle headlamp, or the like, comprising a condenser system consisting of a plurality of lenses of short focal length arranged side by side, reflecting means for deflecting the lateral light from the condenser lenses, or the outer ones thereof, into the main beam, and an objective of comparatively long focal length imaging the emergent faces of the condenser system or of a diaphragm at or near its own focal plane and projecting the image thereof outside the lamp. A beam with a sharp marginal cut-off, with little dispersion, is thus obtained.

## No. 491,062. "Improvements in or Relating to Lamps."

*Pintsch Aktiengesellschaft, J. Dated January, 30,  
1936. (Convention, Germany. Divided from  
No. 490,933.)*

This specification discloses a simpler optical system than that in No. 490,933, with a similar object in view. The optical system comprises a long focus objective and a short focus condenser system disposed close to the light source. The condenser system comprises a section of concave mirror located in rear of the light source and a convex lens in front of the light source, with its focus coinciding with the source. The condenser illuminates the objective with an image of the light source formed at or near the objective, and the condenser system is arranged near the focus of the objective so that an image of the aperture of the condenser system is projected outside the lamp by the objective.

## No. 491,208. "Improvements in or Relating to Electric Gas Discharge Tubes."

*N. V. Philips Gloeilampenfabrieken. Dated  
April, 19, 1937. (Convention, Germany.)*

According to this specification, the wall of the tube, or a glass screen with which the tube is provided, of an electric gas discharge lamp, comprises two layers of luminescent glass separated by semi-transparent or translucent layer, which transmits the rays of the discharge by which the outer layer of glass is excited.

## No. 491,224. "Improvements in Fluorescent Materials for Electric Discharge Tubes."

*The Franco-British Electrical Company, Ltd.,  
and Brackensee, A. H. Dated February 26,  
1937.*

This specification covers a fluorescent coating in a low-pressure mercury discharge tube containing zinc silicate in proportions corresponding to  $\text{ZnO.SiO}_2$  and beryllium silicate, manganese being employed as an activator. The beryllium (reckoned as oxide) should equal about one-third of the zinc (also reckoned as oxide).





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Authorities are agreed that much of the prevalent eye strain and defective sight can be avoided by eliminating the dazzling glare of incandescent gas mantles and other high power lighting units. In practice, Vitreosil (pure fused silica) has proved one of the most efficient available means of diffusing glare without undue loss of light. Vitreosil also possesses unique decorative value and complete heat resistance.

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# VITREOSIL

## Public Lighting With Gas

A village to have a public lighting installation for the first time is Dechmont, in West Lothian, which has recently been brought on the gas mains. Gas has been chosen as the illuminant under a ten-year contract, and three-mantle lamps have been installed. Another agreement for a similar term of years in which gas is used affects the neighbouring district of Blackridge, while Cardenden (Fifeshire) has renewed its contract for gas lighting.

Sittingbourne and Milton U.D.C. have renewed their contract for gas lighting in the streets under their control. About 214 lamps are at present installed. In adjoining districts new contracts, also specifying gas, have been made by the Parish Councils of Bapchild (a three-year agreement), Newington, Bobbing (a seven-year contract), and Borden (also an agreement for a period of seven years). In the last two villages there was no public lighting installed previous to these contracts.

Up-to-date gas lighting has replaced an electrical installation which has operated for the last seven years in Wotton-under-Edge. The number of lamps concerned is seventy-seven.

Improved lighting in the main thoroughfare through Kenilworth has brought the standard up to that laid down by the Ministry of Transport Departmental Committee. The lamps used are twenty-eight six-light gas lamps fitted with reflectors; mounting height is 15 feet, and lamps are spaced at intervals not exceeding 120 yards. The City of Coventry Gas Department is responsible for the installation.

About 500 gas lamps are covered by a renewal of the street lighting contract for Houghton-le-Spring.

Other recently renewed contracts relate to Rawcliffe, Yorks; Lyndhurst (ten years); Duns, Berwickshire; South Petherton, Martook, and Montacute, Somerset; Earby and Thornton, Lancs.; Lavenham, Great Cornard, and Long Melford, Suffolk; and Tewkesbury.

## Praed Street's New Gas Lighting

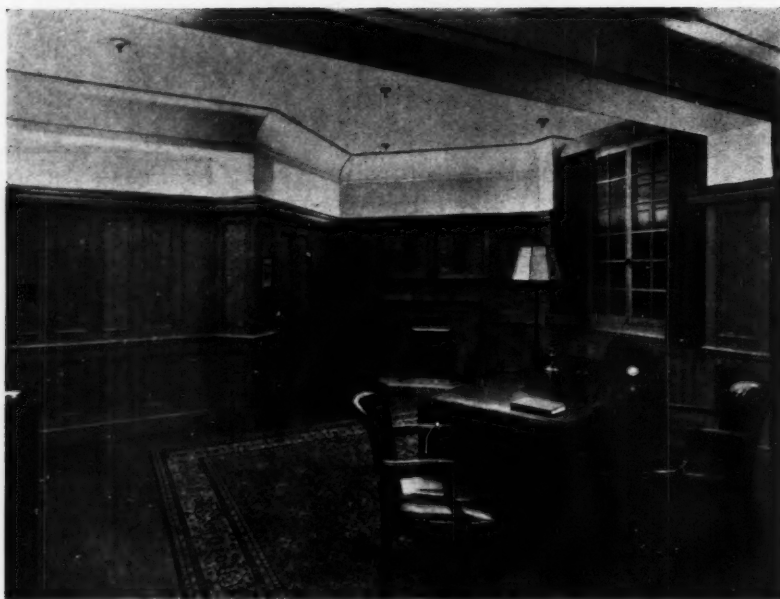
Under the fifteen-year contract in force in the area controlled by the Paddington Borough Council, considerable improvements have been carried out in the gas lighting of a number of important shopping thoroughfares, among them being Westbourne Grove, Queensway, and Praed Street.

Westbourne Grove is now lighted by ten-light gas lamps of a new and improved (Maxill) type, mounted at a height



Westbourne Grove, London, in which improved gas lighting has recently been introduced.

of 25 feet, on columns constructed to the specification of the Borough Engineer, Mr. W. E. Roberts, and spaced at intervals of about 120 feet. Clock controls and a special arrangement for turning on the lamps immediately in case of fog are further points of interest about this installation, in which excellent visibility has been attained.



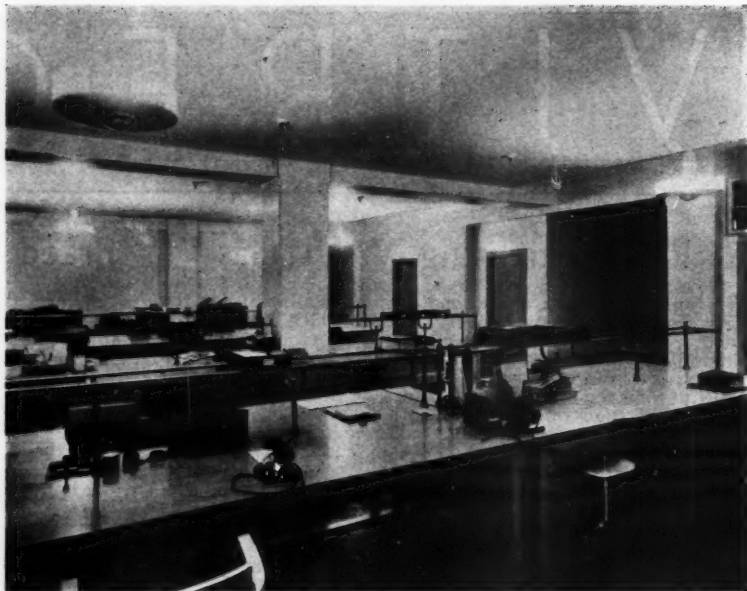
## LIGHT IN THE OFFICE

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# G.V.D

## CONTROLLED LIGHT



## NOTES ON ILLUMINATING ENGINEERING ABROAD

(Specially Contributed—H. L. J.)

**Germany.**

At the World Power Conference in Vienna last month only one section (the Public Lighting Section) dealt primarily with lighting. In other cases lighting was only mentioned in connection with other reports on energy. Mr. B. Seeger accordingly undertakes, in "Das Licht," to extract statements about the development of lighting in these other fields. In rural districts, although there is application of electric light to prolong the working day, an increase in lighting consumption is particularly remarkable since the introduction of wireless. For experimental purposes sixteen villages were furnished with all-electric equipment. It was observed that after discontinuing these experiments the current consumption for cooking went down by 25 per cent. and water heating by 20-70 per cent. Only light and motive power consumption remained the same or showed an increase. In offices or factories a marked tendency towards better lighting is becoming apparent. In places where discharge metal vapour lamps, with their increased efficiency, have been applied for general lighting equipment local lights are being largely abandoned.

At the recent annual conference of the Illuminating Engineering Society in Germany, held in Munich, the occasion was marked by special flood-lighting. It is reported, however, that approximately twenty-five public buildings and other objects are permanently floodlit, the total load being 530 kW. In the majority of cases tungsten filament lamps are used, discharge lighting not being yet adopted to any great extent.

**Sweden.**

The "Molins Fountain," lighted by 24 submerged underwater reflectors each equipped with a 250 w. filament lamp, during a recent "Lighting Week" in Stockholm.

**Australia.**

We are indebted to Mr. Leslie J. Robertson, one of the members of the I.E.S. resident in Sydney, for the above picture. This definitely records "lighting history" in Australia. The picture shows McIlwraith's, a retail grocery establishment at Hurstville, a suburb of Sydney. This new branch was recently lighted throughout by fluorescent discharge tubes supplied by Scanlon's New Neon, Ltd. (Sydney). Not a single filament lamp is used in the building, and these are the first "all-fluorescent tube lighted" premises in Australia. A very uniform illumination of 10 ft.c. was obtained at floor level, with 40 ft.c. in the windows. It is estimated that the consumption of electricity would have had to be increased by about 40 per cent. in order to obtain similar values of illumination by ordinary methods—quite apart from the outstanding effect in enhancing the appearance of coloured goods, an effect that has been also noted in this country.

According to the "New Zealand Electrical Journal" a report recommending standardisation of street lighting has been submitted by the N.S.W. Minister of Transport. If the scheme is approved financial aid for main road lighting will be given in approved cases, subject to the methods complying with official recommendations.

**France.**

M. R. Toussaint, in the "Bulletin Française des Electriciens," reports investigations into methods of imitating natural daylight. As we are also aware in this country appliances purporting to furnish "artificial daylight" vary greatly. Difficulties are twofold. There is a certain disinclination to adopt exact filters for the correction of artificial light (which may involve considerable absorption). But there is also the difficulty in deciding what constitutes average or standard daylight. M. Toussaint makes suggestions for a synthetic average daylight based on the emission of violet and blue, yellow and green, orange and red, in prescribed proportions, the result being midway between diffused blue skylight and light from a grey sky. The standard daylight may be obtained from three similar sources, each equipped with a bichromatic filter of the colour combinations mentioned above—or three such filters may be inserted in the beam of a single source.

## Lighting an Indian Swimming Bath

A somewhat elaborate system of lighting, recently installed in a swimming bath attached to one of the palaces of an important independent State in India, is here shown. The twenty-two columns round the bath carry special units at the tops of each. These embody etched panels of light and dark peach-coloured flashed opal glass with copper metal work finished in sky blue (to match the columns), with gilt relief metal fins. Each unit accommodates twenty-five 40-watt Osram lamps and four architectural lamps outside. In addition ten special wall fittings were installed.

The illustration below shows another fitting of striking design, a pendant with metal work also finished in blue and gold, and fitted with a series of opal globes. The larger (11 in.) upper globes are furnished with 40-watt lamps and the smaller (9 in.) lower globes with 25-watt lamps. This fitting is designed to illuminate the well of the spiral staircase connecting the floor above with the bath below. The fittings were supplied by the General Electric Company, Ltd. The architects were Messrs. Ballards, Thomson and Matthews (Calcutta).

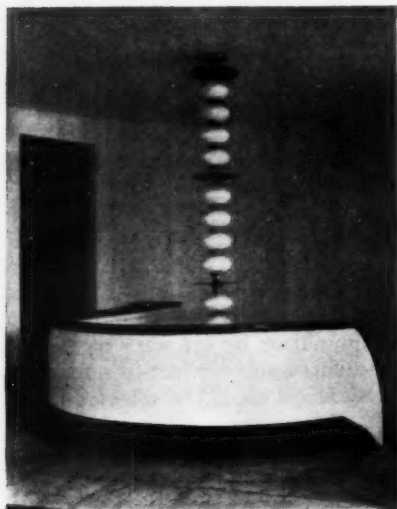


Fig. 2. Specially constructed lighting fitting for the staircase well connected with the swimming bath shown in Fig. 1.

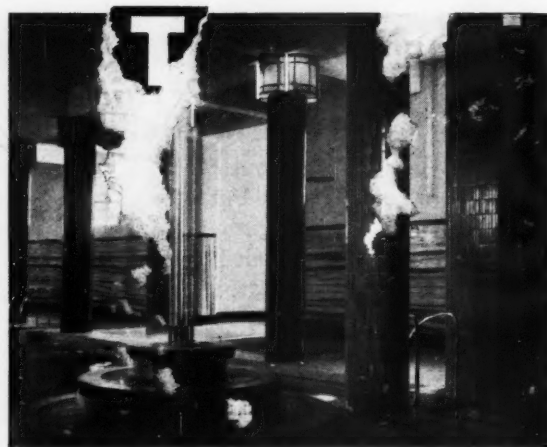


Fig. 1. Swimming bath lighting G.E.C. fittings, in a Palace of East India.

## Factory Lighting

The annual report of the Chief Inspector of Factories for 1937 contains some interesting comments on lighting. Mention is made of the Committee reviewing existing standards (whose report is expected very shortly). Reports indicate a general, if gradual improvement in lighting throughout the country. One development has been the increasing use of electric discharge lamps (both mercury and sodium) for industrial lighting. In several instances, however, complaints of colour distortion or stroboscopic effects have been received—the latter difficulty, where experienced, has been readily overcome by combinations of discharge and filament lamps.

The use of local lighting at machines is extending and experiments are being made with rubber and other calendars. Strip lighting has been thus used but maintenance on these heavy machines, which are subject to vibration, has proved difficult, and more robust lamps are being substituted.

Instances of good results attending improvements in the lighting of textile and cotton mills are recorded. Reference is also made to the method adopted by a large firm of photographers who have installed subdued indirect lighting in dark rooms having white walls and ceilings. Although the intensity of lighting is very low it is found that after some four or five minutes everything in the room can be seen with ease.

It is encouraging to learn that in several instances improvements in lighting systems of factories have been directly due to visits to the Home Office Industrial Museum where an exhibit illustrating the principles of good lighting exists.

## Lighting at the Empire Exhibition

Mr. R. O. Ackerley and Mr. A. Mansell are to deal with the lighting of the Empire Exhibition, Glasgow, at a meeting of the I.E.S. Commercial Lighting Section on December 7, so we must not anticipate what the former will have to say. It happens, however, that Mr. Ackerley took this subject as an appropriate one for his address to the Glasgow Local Centre on October 19. He forestalled the criticism, apt to be aimed at every exhibition, that they had "spoiled the ship for a pennyworth of tar" in the sense of not providing enough light. After all, the question for those responsible for an exhibition intended to pay its way was whether, if more money had been spent on lighting, greater attendances would have resulted. Mr. Ackerley did, however, concede that the effect would have been better if every building had been lighted up every night. There were, on occasions, alternations of bright lighting and patches of gloom. Some reference was made to the Tait Tower, the "call bird" of the Exhibition, the chief features of exterior lighting and the lighting of the fountains. As regards interior lighting the United Kingdom Pavilion was probably the outstanding example.

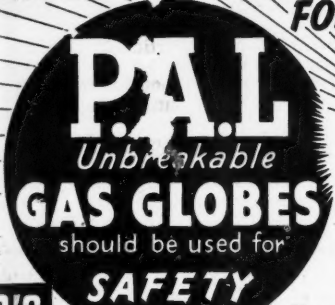
## A Newel Fitting

The adjacent picture shows a pleasing form of fitting, the "Newelite," introduced by the British Thomson-Houston Company, Ltd. This, as the name implies, is designed primarily for mounting on staircases, and for use in the hall or porch, but it can also be used with advantage on the ceilings of period rooms. The "Newel Lamp" itself may be had in two finishes, parchment or flame, and the fitting is made of a rich brown moulded composition.





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## The Illuminating Engineering Society (U.S.A.)

Notes on Transactions (Sept., 1938).

**NEWS:** The two summer lamp-shows (Chicago and New York) featured two types of lamps with success—the *I.E.S. Specification lamp* and the *blue ribbon lamp*. Particularly the latter, presented for the combined judgment of representatives from the American Institute of Architects (New York Chapter), the American Institute of Decorators, and the I.E.S., proved of special interest. To foster the application of fluorescent discharge lamps the General Electric Institute, Nela Park, Cleveland, arranged a large scale exhibition, showing the effects on flower beds, in shop windows, in florists' shops, etc. A feature of the forthcoming Golden Gate (San Francisco) World's Fair Exhibition is the *Hall of Electricity*, which will cost approx. 1,000,000 dollars, and which will comprise an all-electrified farm and an all-electric business show. The latter will show electrically-operated office equipment from the most modern lighting fitting to the latest teletypewriter. To enable approx. 100,000 people to follow a *night game at the Brookside Stadium*, Cleveland, Ohio, a floodlighting installation has been put into service. This throws a total light beam of 9,000,000 c.p. on to the field. The energy supplied is distributed through two 75-KVA. transformers, one at each end of the field. A new *handbook of residential lighting practice* has been issued by the lamp division of the Westinghouse Company. It discusses home lighting problems in terms easily understandable by the layman, and is directed to the consumer.

**SUBJECTS OF PAPERS:** "Street Lighting and Safety," by L. J. Schrenk. This paper is a continuation of one published by the same author in December, 1937 ("Saving Lives with Light"), and gives further evidence of the benefit of improved lighting on traffic conditions. Experiences in thirty-one miles of street in Detroit, before and after improvement of the lighting, are recorded and tabulated. An analysis shows that during 1934-36 (before improvement of lighting)—eight persons were killed owing to drivers running through the "Stop" sign or signal light at night. No daylight fatalities of this character were registered in the same period. After improvement of lighting conditions no night accidents of this kind occurred. Further, good lighting definitely reduces fatalities resulting from speeding. Cases of pedestrians walking or running across the paths of motor cars decreased from five per annum before improvement to nil after. The author finally enumerates seven points to be observed when considering the relation between street lighting and traffic conditions.

"Some Practical Aspects of Lighting Kitchen Work Areas," by J. T. Bailey. Advice is given on the lighting of kitchens. The author explains up-to-date lighting equipment for sinks, draining boards, pastry tables, etc. General illumination values of 20 f.c. on the working plane are recommended. To achieve this over the sink a 60 watt lamp suspended 5 ft. from the working plane is necessary. The general use of anti-glare materials is also recommended. All boards should be lit by light-troughs suspended over the outer edge of the board, thus throwing the light in the same direction as the person is looking. Care in the use of highly reflecting metal surfaces and the avoidance of colours which absorb too much light are advised.

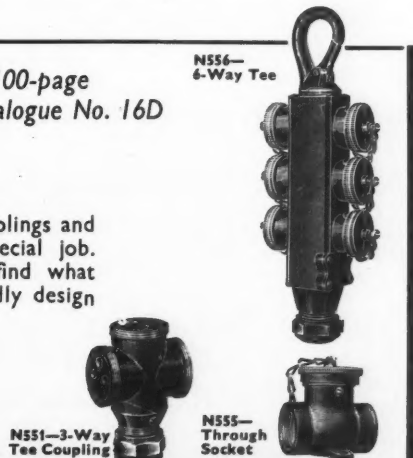
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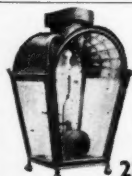
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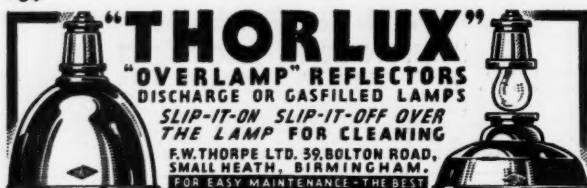
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### Catalogues and Advertising Literature

BRITISH THOMSON-HOUSTON COMPANY, LTD.—Leaflet illustrating the Mazda "Newelite" for use on staircases, etc.

JOHN DUGDILL AND Co., LTD.—Catalogue dealing with movable focussing and self-sustaining fittings.

FORWARD ELECTRIC COMPANY, LTD.—Catalogue of Lighting Fittings. Many types of fittings in diffusing glass, including both pendants and rectangular ceiling units, are listed.

KEITH BLACKMAN, LTD.—Particulars of new special winch for use with raising and lowering gear fitted with "Staybrite" tape instead of wire rope.

LINEALUX, LTD.—Illustrating showcase lighting reflectors, desk lamps, illuminated signs, etc.

STANDARD TELEPHONES AND CABLES, LTD.—Catalogue describing Remote Control and Street Lighting and Multi-Service System: illustrates numerous applications of centralised control.

TROUGHTON AND YOUNG, LTD.—Leaflet illustrating a new series of lighting units of the Ultralux-G type, in white or ivory finished opal glass, and of very simple nature.

### Maxilla Lamps

Maxilla Lamps.—We regret to note a clerical error in the reference to the Parkinson Brimax Maxilla Lamps in the description of the Parkinson and Co.'s exhibit at the A.P.L.E. Exhibition, which appeared in our October issue (page 243). The frogs available for these lamps should be stated to be 9 in. to 3 ft. 6 in. (not 386 in.) in length.

### Holophane Industrial Lighting Conference

In view of the forthcoming H.O. Report on Factory Lighting Requirements, a special conference of works engineers was arranged at Holophane House on November 1. Many important firms were represented in the audience, numbering about 120. There was an address of welcome by Mr. W. T. Dean (Managing Director), after which lectures were delivered on "Science Behind Holophane Glass" (Dr. S. English, Director of the Holophane Research Labs.), "New Developments in Lighting" (Mr. E. Stroud, Chief Engineer), "Safety First in Factory Lighting" (Mr. E. W. Murray, H.O. Industrial Museum), "Practical Industrial Lighting" (Mr. L. M. Tye), and "Colour Lighting" (Mr. R. G. Williams).

Lunch was taken at St Ermin's Restaurant. In the evening a dinner at the Criterion Restaurant terminated an instructive and a successful day.

### Lighting Contracts

GENERAL ELECTRIC COMPANY, LTD.—Sheffield Corporation: Order with the General Electric Company, Ltd., for 190 open type non-asymmetric "Wembley" street lighting lanterns for use with 300-500-watt lamps. Shipley Urban District Council: For 105 G.E.C. new Di-fractor street lighting lanterns, specially designed for trolley bus pole mounting.

SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD.—A rush order was placed for 1,400 torches, fitted with Siemens Full o' Power batteries, for the British Legion force, intended for Czecho-Slovakia.



